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APPENDIX A

SECTION A1

DRAFTING STANDARDS

A1.1 INTRODUCTION

This Drafting Manual was developed for the Clean Water Program for Greater San Diego (CWP) with the following objectives in mind:

- Enhance the level of graphic consistency
- Provide a set of guidelines in the preparation of design documents, regarding drafting notations, symbology and abbreviations
- Establish a level of uniformity
- Supply information to the consultant firms relating to the design and drafting methods and materials for the Program

This manual is not intended to serve as a design textbook, nor as a substitute for professional experience. Furthermore, this manual does not address procedural issues or organizational responsibilities. The primary intent is to address graphic issues and establish guidelines and drafting standards for design drawings.

The manual is presented in 21 subsections. Subsections A1.2 and A1.3 describe the symbology and abbreviations for all the disciplines that are expected to be used on all design projects under the CWP. Subsection A1.4 describes the various classifications of drawings and what is expected in each of these drawings. Subsections A1.5 - A1.17 give guidelines for the choice of scale, type of lettering, thickness or pen, direction of the north arrow and selection of key map. Subsection A1.18 describes the numbering systems to be used on the drawings for equipment, piping, and instrumentation. The sequence of drawings is discussed in Subsection A1.19. Subsection A1.20 gives some rules regarding reproduction. Subsection A1.21 elaborates on discipline specific aspects which were not covered in the more general sections.

A1.2 SYMBOLOGY

Preparation of clear and unambiguous drawings requires strict adherence to a standard nomenclature. A system of standard symbols for component identification also makes coordination and communications between design disciplines and construction trade groups more effective.

The standard symbols for DESIGN CONSULTANTS to use in design projects for the CWP are presented on Standard Contract Drawings R-1 through R-7 in Volume IV, Appendix A, Section A3. Symbols for the civil, architectural, structural, mechanical, electrical, and instrumentation disciplines are included.

The symbols to be used were derived from standards established by the American National Standards Institute (ANSI) and the Instrument Society of America (ISA), and other nationally-recognized organizations. Additional symbols, if needed for project-specific use, should be obtained from the same organizations.

A1.3 ABBREVIATIONS

The CWP does not encourage reliance on abbreviations to convey information on drawings. However, it is recognized that space limitations would mandate use of abbreviations in certain situations. Abbreviations used in the CWP shall conform to ANSI as much as possible. Fluid abbreviations and standard abbreviations are presented on Standard Contract Drawings G-3 through G-7 in Volume IV, Appendix A, Section A3.

Abbreviations must be used carefully. Important rules are:

- Abbreviations with more than one common meaning should be avoided.
- An abbreviation used on one drawing must have the same meaning on all the drawings.
- A word abbreviated once on a drawing must be abbreviated everywhere on the drawing.
- Abbreviations shall only be used to avoid excessive clutter or "busyness" on drawings.

A1.4 CLASSIFICATIONS OF DRAWINGS

This section defines how drawings will be classified.
CLASSIFICATION BY AREA

Treatment plant drawings can be classified according to Table A1-1. Unassigned area numbers are available to make the system flexible.

Table A1-1

AREA NUMBERING SYSTEM

Number	Area	Number	Area
1.	Influent Pump Station	23.	Unassigned
2.	Influent Metering	24.	Unassigned
3.	Unassigned	25.	Tertiary Filters
4.	Unassigned	26.	Waste Backwash Tank
5.	Headworks	27.	Unassigned
6.	Unassigned	28.	Unassigned
7.	Unassigned	29.	Unassigned
8.	Unassigned	30.	Chlorine Contact Tank
9.	Unassigned	31.	Effluent Control Structure
10.	Primary Sedimentation Tanks	32.	Effluent Junction Box
11.	Intermediate Pump Station	33.	Effluent Drop Structure
12.	Flow Equalization	34.	Unassigned
13.	Unassigned	35.	Chlorination Building
14.	Unassigned	36.	Unassigned
15.	Aeration Basins	37.	Unassigned
16.	Unassigned	38.	Unassigned
17.	Unassigned	39.	Unassigned
18.	Unassigned	40.	Dechlorination Facility
19.	Unassigned	41.	Unassigned
20.	Secondary Clarifiers	42.	Unassigned
21.	Secondary Effluent Splitter Box	43.	Unassigned
22.	Coagulation & Flocculation Structure	44.	Unassigned

Table A1-1 (continued)

AREA NUMBERING SYSTEM

Number	Area	Number	Area
45.	Sludge Pumping Station	73.	Unassigned
46.	Unassigned	74.	Unassigned
47.	Unassigned	75.	Dissolved Air Floatation Thickeners
48.	Unassigned	76.	Unassigned
49.	Unassigned	77.	Unassigned
50.	Administration Building	78.	Unassigned
51.	Operations & Maintenance Building	79.	Unassigned
52.	Unassigned	80.	Digesters
53.	Unassigned	81.	Unassigned
54.	Unassigned	82.	Unassigned
55.	Chemical Building	83.	Unassigned
56.	Unassigned	84.	Unassigned
57.	Unassigned	85.	Sludge Dewatering
58.	Unassigned	86.	Unassigned
59.	Unassigned	87.	Unassigned
60.	Odor Control Facilities	88.	Unassigned
61.	Unassigned	89.	Unassigned
62.	Unassigned	90.	Sludge Drying
63.	Unassigned	91.	Unassigned
64.	Unassigned	92.	Unassigned
65.	Utility System	93.	Unassigned
66.	Electrical Substation	94.	Unassigned
67.	HVAC System	95.	Sludge Composting
68.	Unassigned	96.	Unassigned
69.	Unassigned	97.	Unassigned
70.	Energy Recovery Building	98.	Unassigned
71.	Unassigned	99.	Unassigned
72.	Unassigned	100.	Unassigned

Numbering of facilities (e.g. valves and valve vaults, etc.) between treatment plants/pumping stations, etc., shall be based on area designations for the originating facility. For example, numbering of facilities on the sludge forcemain between Point Loma Wastewater Treatment Plant and another project site would be based on the area designation for Point Loma Sludge Pumping Station.

CLASSIFICATION BY DISCIPLINE

Civil Drawings

- Overall Site Plan
- Horizontal Control & Paving Plans
- Grading and Drainage Plans
- Yard Piping Plans
- Sections
- Profiles
- Details
- Demolition

Landscaping and Irrigation Drawings

- Irrigation Plans
- Planting Plans
- Planting Plan Enlargements

Architectural Drawings

- Floor Plans
- Roof Plans
- Exterior Elevations
- Cross Sections
- Interior Elevations
- Reflected Ceiling Plans
- Schedules

Structural Drawings

- Foundation and Floor Plans
- Top and Walkway Plans
- Roof Framing Plans
- Cross Sections and Details

Mechanical Drawings

- Area Layouts
- Utilities (HVAC, Plumbing, etc.)
- Isometrics
- System Flow Diagrams
- Piping Schedules
- Equipment Schedules

Electrical Drawings and Schematics

- Site/Plot Plans
- Power Block Diagrams
- Single Line Diagrams
- Schematic Diagrams
- Electric Equipment Elevations
- Power & Control Plans
- Lighting Plans
- Receptacle Plans
- Schedules

Instrumentation Drawings

- Process Control Diagrams
- Logic Diagrams
- Panel Layout Drawings
- Loop Interconnection Drawings
- Instrument Installation Details
- Piping and Instrumentation Diagrams

CLASSIFICATION BY PURPOSE

Drawings can also be classified by the purpose they serve in the design and construction process.

Progress Submittals

Progress submittals will be made to the City's Project Manager (PM) at 30, 60 and 90 percent completion of design. Drawings can be classified by the degree of completion represented by the submittal. Volume I, Chapter 3, the Scheduling Guidelines, defines the degree of drawing completion appropriate for 30, 60, and 90 percent submittals.

Camera Ready Drawings

These are the final, complete drawings, ready to print and bind in one or more volumes for prospective bidders.

Addendum Drawings

Addendum drawings are issued by a formal process between the advertisement and bid opening. Addendum drawings may change, add, or remove some of the work of the previously issued drawings.

Contract Drawings

When the contract is awarded, addendum drawings shall be incorporated onto the camera ready drawings to form the contract drawings.

Supplemental Drawings

Supplemental drawings are issued after contract award to explain or clarify a construction drawing. These drawings do not affect cost or schedule and are not a part of the contract drawings.

Change Order Drawings

Change order drawings affect the work of the contract and become part of the contract drawings after the change order is signed by the Owner and the Construction Contractor.

"As-Built" Drawings

These drawings are markups prepared by the Construction Contractor on copies of the contract drawings to show how the actual facility departs from the contract drawings.

Record Drawings

After construction is complete, the contract drawings are modified by the DESIGN CONSULTANT to incorporate the "as-built" information obtained from the Construction Manager.

A1.5 DRAWING MATERIALS

Four mils mylar shall be used for all drawings. Drawings submitted on mylar must be prepared with ink, suitable plastic pencil, or electrostatic toner.

The entire drawing should be on the upper side of the sheet. Placing certain portions on the under side of the sheet is not acceptable.

If stick-on material is placed on a drawing, a photographically produced single sheet mylar copy, which permits high quality prints and microfilm, must be prepared for submittal to the City. The City will not accept drawings with stick-on material. Mylar drawings with stick-on materials, scuff marks, creases, or identations shall not be accepted by the City.

A1.6 SIZE

Drawings should be prepared in accordance with ANSI Standard Y14.1-1975. ANSI standard sheet sizes are shown in Table A1-2.

"D" size sheets are required for camera ready drawings and are also appropriate for some addendum drawings. Other addendum drawings are better shown on "A" size sheets. Change order and other drawings prepared during construction can use "A", "B", or "D" sheets. Record drawings will be "D" size.

A1.7 STANDARD BORDERS

All "D" size drawings must be on the standard border. A blank standard border is shown in Volume IV, Appendix A, Section A3, as Standard No. SD-20. The standard border serves several purposes. It:

- Identifies the drawing with the Clean Water Program
- Provides information used by the City to archive drawings
- Identifies the DESIGN CONSULTANT and staff who are responsible for preparation of the drawing
- Provides other basic information (title, scale, revisions, etc.) in a consistent location and format

A1.8 USE OF WASH-OFF MYLAR

The use of wash-off mylar is acceptable when an existing drawing or a major portion of such a drawing can be used as a base for a new drawing with minor alterations.

It cannot be overemphasized that clean, streak-free wash-off mylars are to be used so they can generate reproducible mylars and can be adequately microfilmed.

Lettering on the wash-off mylar must be clear and legible with line quality suitable for reproduction. Minimum line width should be 0.015 inch

Table A1-2

ANSI STANDARD DRAWING SHEET SIZES

ANSI	Size (Inches)		Margin (Inches)	
Designation	Width	Length	Width	Length
A	8.5	11.0	0.25	0.38
B	11.0	17.0	0.38	0.62
C	17.0	22.0	0.75	0.50
D	22.0	34.0	0.50	1.00
E	34.0	44.0	1.00	0.5

A1.9 DRAFTING PRACTICES

General guidelines are:

Each drawing prepared for the CWP must be uncluttered, legible, and easy to understand. Drawings must have a high degree of uniformity. This section presents scaling, lettering, lining, notation, and dimensioning techniques and practices which all disciplines must follow.

- Eliminate Repetitive Details: When several items have common details, show the common detail once.

- Eliminate Unnecessary Lines: Only those lines necessary to convey the design should be used. For example, closely spaced parallel lines to depict curbs are superfluous; one heavy solid line should suffice.
- Use Abbreviations Sparingly: Abbreviations may be used only where they are required to save space. Abbreviations must be clear and easily understood.
- Use Symbols Frequently: Symbols reduce drafting time, increase legibility, and conserve space.
- Use Tabulations Appropriately: Tables consolidate related data into one location which normally might be scattered in many locations.

A1.10 SCALE

The general rule is to use the smallest possible scale to show the view without obscuring vital details. Scales must be selected with the following requirements in mind:

- Maintain clarity when notes and dimensions are added to the drawings.
- Maintain legibility when drawings are reduced to half size.
- Maintain readability when files are microfilmed for archival purposes.

The scales listed in Table A1-3 are recommended; however, they may be varied to accommodate the need of a particular drawing. The use of distorted scales (different horizontal and vertical scales) is acceptable for profile drawings.

The rules listed below should be followed to show the scale of a drawing:

- When multiple views on a drawing are not to the same scale, the appropriate scale should be centered 1/4-inch below the title of each view. The title block scale should read "as shown."
- When the entire drawing is to the same scale, the scale should be listed in the title block.
- When an entire drawing (like a diagram, a schematic, or an isometric drawing) is not to scale, "No Scale" should be noted in the title block. If only one view on the drawing is not to scale, the notation "No Scale" should be placed below the view in question.
- The notation "NTS" (not to scale) should only be used for specific dimensions within the drawing that are not to scale.
- For plan and profile drawings, the vertical and horizontal scales should have a 1:10 ratio. That is, if the vertical scale is 1 inch = 4 feet, then the horizontal scale should be 1 inch = 40 feet. Similarly, a 1 inch = 10 feet vertical scale would correspond to a 1 inch = 100 feet horizontal scale, and so on.

Table A1-3

TYPICAL DRAWING SCALES, ALL DISCIPLINES

Scale	Drawing Type
1 inch = 100 feet 1 inch = 40 feet 1 inch = 20 feet 1 inch = 16 feet 1 inch = 10 feet 1 inch = 8 feet	General Plan Views
1 inch = 4 feet	Enlarge Plan Views
1 inch = 4 feet, vertical and 1 inch = 40 feet, horizontal	Profile Views
1 inch = 4 feet 1 inch = 2-2/3 feet 1 inch = 1-1/3 feet 1 inch = 1 foot	Sections, Details
1-1/2 inch = 1 foot 3 inches = 1 foot	Enlarged Sections, Details

A1.11 LETTERING

Drawings should use simple letters and figures without embellishments. Lettering should be Gothic style, vertical capitals. Slant lettering is not acceptable. For illustrations of Gothic styles, refer to the ANSI Standard Y14.2M-1979, Figures 16 and 17.

The following are general guidelines for lettering.

Size: Lettering on full size "D" sheets should never be less than 1/8-inch in height. Table A1-4 presents Leroy Templates and pen sizes to be used at several locations on drawings. Figure A1-1 presents examples.

Table A1-4

MECHANICAL LETTERING SIZE

Purpose	Leroy Template	Leroy Pen
Cover Sheet		
Name of Project	750	6
Drawing Number	200	2
C.I.P. Number, etc.	175	2
Cover Sheet Notes	140	1
Title Block Information		
Project Name	140	1
Drawing Title	200	1
All Other Information	140	1
City "D" Number (Lower Right)	200	1
Scale Identification (View)	140	2
Column Line Balloons (Arch & Struct)	175	2
Main Titles		
Drawing Body	175	2
Key Plan	140	1
Subtitles	140	1
Section and Detail Callouts	140	1
Drawing Text	120	0

Mechanical Lettering (Leroy): Mechanical lettering style should be vertical Leroy with appropriate Leroy pen sizes and letter heights as shown in Table A1-4 and Figure A1-1. Leroy lettering should be used for title blocks, view titles, scale identification, column lines, and section and detail balloons. Higgins Black Magic or Koh-I-Noor ink are acceptable.

TEMPLATE SIZES ARE THOUSANDTHS OF AN INCH:

EG. TEMPLATE 175 = 0.175"

1000 = 1.000"

120 LEROY TEMPLATE / PEN SIZE 0

140 LEROY TEMPLATE / PEN SIZE 1

175 LEROY TEMPLATE / PEN SIZE 2

200 LEROY TEMPLATE / PEN SIZE 3

500 LEROY TEMPLATE/PEN SIZE 6

LEROY LETTERING SET AND TEMPLATE SIZES

FIGURE A1-1

Freehand Lettering: Freehand lettering is acceptable as long as it matches the style and size required of mechanical lettering. Either ink or suitable plastic pencil is acceptable. A lettering guide or preprinted underlay should be used to insure straight lines and uniform letter sizes.

Typewritten Lettering: Typewritten lettering is appropriate for general notes on title sheets. Typewritten lettering can be done by any of the following methods:

- Typing directly on the drawing using specially modified typewriters with open-ended carriages.

- Typing onto transfer film (sticky-back) using a regular typewriter and applying the film to the drawing. The drawing must be photographically reproduced to create a new plan sheet before it is submitted to the CWP at the end of design. Transfer film is not acceptable on submittals.

Kroy Lettering: The Kroy machine places black characters on transparent transfer tape which is not acceptable on drawings without photoreproduction.

Reading Direction: Normally, all letters and figures should be readable from either the bottom or right edge of the sheet. The guide for reading is as follows:

- Horizontal lettering should read from left to right.

- Vertical lettering should read from bottom to top.

- Diagonals should read from left to right, bottom to top up to 120E, top to bottom above 120E (see Figure A1-2 for detail).

Other Guidelines:

- All lettering should be upper case.

- Fractions should be written horizontally and have slanted mid lines (1/2, 1-1/2).

- The number 1 should have a base to avoid confusion with the letter I.

A1.12 LINE WORK

Engineers, designers, and drafting technicians must keep in mind that the ultimate products of their work are the prints made from their drawings and not the drawings themselves. Lines and lettering must be of adequate size and weight to produce legible half-size reproductions. Lines should be sufficiently thick to print well and make readable photocopies. Line work must be smooth, black, firm, equally spaced, uniform weight and density throughout the drawings and ends should be clearly defined. Line work should adhere to the following guidelines (see Figure A1-3 for detail of the line pattern and width):

LINE WIDTHS

Line widths should vary to distinguish certain features as follows:

1. Extra heavy lines (Pen #3) should be used for main process lines on schematics.

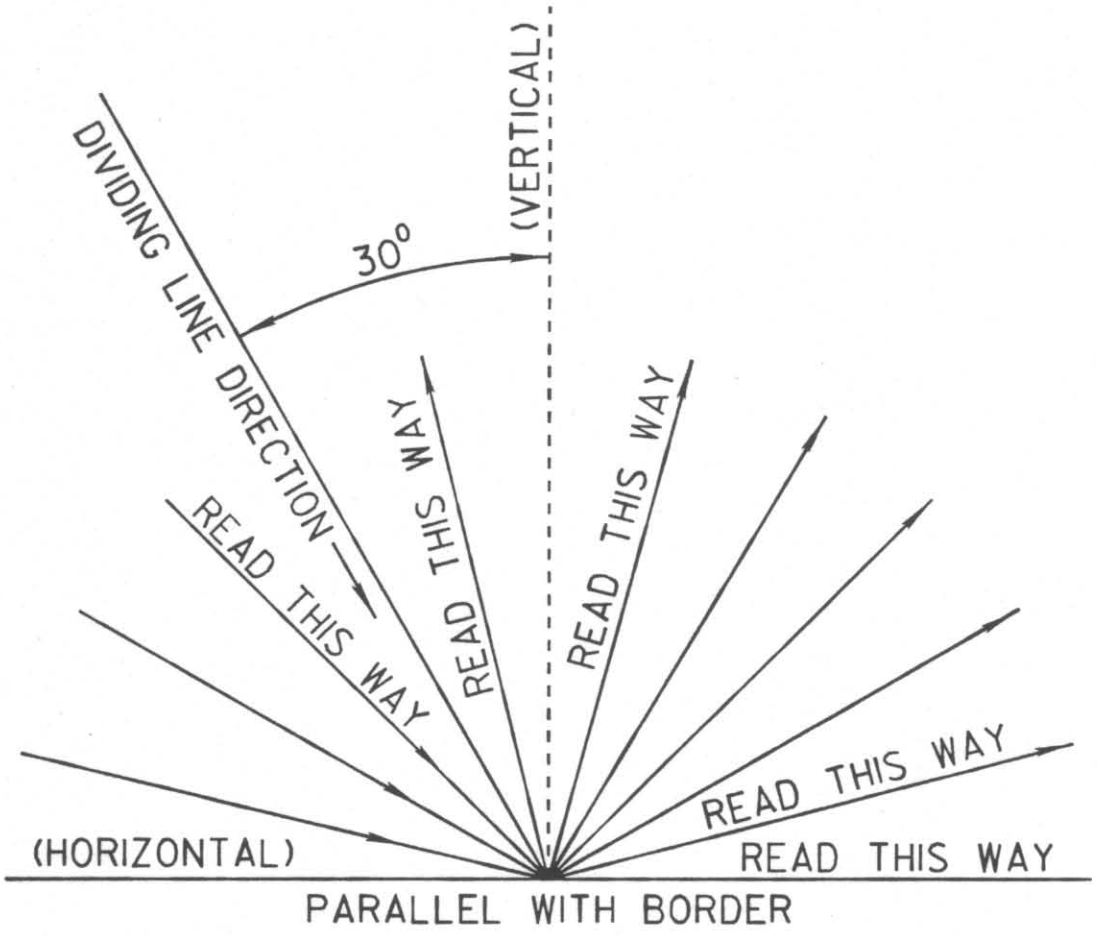
2. Heavy lines (Pen #2) should be used for emphasis for basic outlining features of the new facilities. Examples are base line, construction layout lines, and the outline of objects. Heavy lines should also be used on secondary process lines on schematics, doubleline piping, flange outlines and on cutting plan lines.

3. Medium weight lines (Pen #1) should be used for proposed construction and right of way, match lines, single line drawings, flanges and equipment.

4. Fine lines (Pen #00) should be used for topography, outline of existing and future facilities and other less important details.

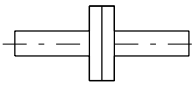
5. Extra fine lines (Pen #000) should be used for centerlines, phantom lines, column lines (refer to Figure A1-4), dimension lines, leader lines, and hidden lines for new and existing facilities.

6. Dashed lines should be used for hidden lines and also to distinguish existing from proposed work.



READING DIRECTION

FIGURE A1–2

NAME	PATTERN	WIDTH	PEN SIZE
SCHEMATIC MAIN PROCESS		EXTRA HEAVY	3
SCHEMATIC SECONDARY PROCESS		HEAVY	2
CUTLINE-PROPOSED FACILITIES		HEAVY	2
CUTTING PLANE LINE		HEAVY	2
DOUBLE LINE PIPING FLANGE		HEAVY	2
MATCH LINE		MEDIUM	1
SINGLE LINE FLANGE		MEDIUM	1
EQUIPMENT	VARIES	MEDIUM	1
OUTLINE EXISTING FACILITIES		FINE	00
OUTLINE FUTURE FACILITIES		FINE	00
HIDDEN LINE PROPOSED FACILITIES		FINE	00
HIDDEN LINE EXISTING FACILITIES		EXTRA FINE	000
DIMENSION LINES		EXTRA FINE	000
LEADER LINE (CALLOUT LINE)		EXTRA FINE	000
LONG BREAKING LINE		EXTRA FINE	000
CENTERLINE, COLUMN LINE, STRUCTURE OUTLINE		EXTRA FINE	000
PHANTOM LINE		EXTRA FINE	000

LINE PATTERNS AND WIDTHS

FIGURE A1–3

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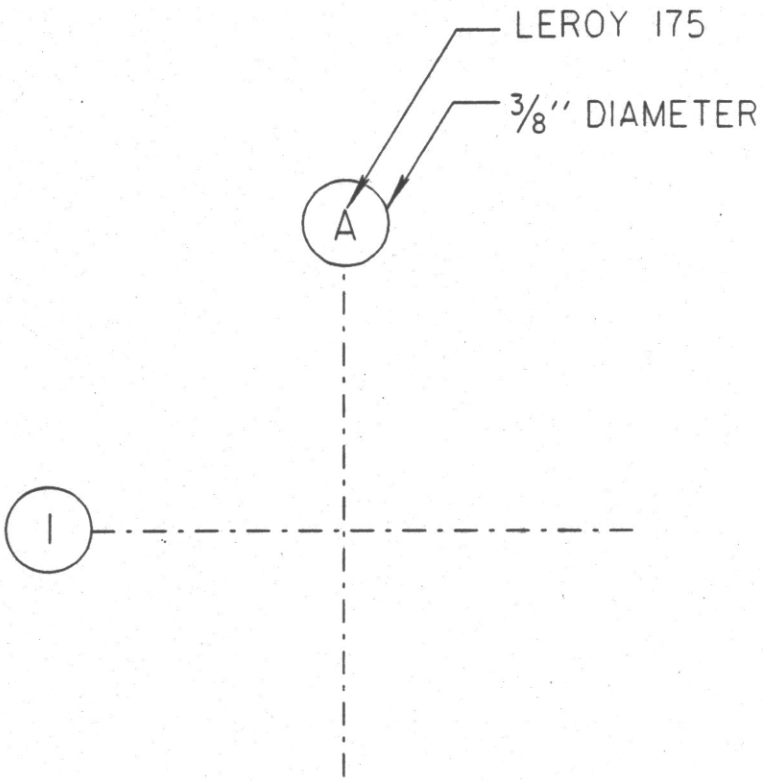


USE A CENTER LINE AS A COLUMN LINE. EXTEND THE LINE 1/4" BEYOND THE VIEW AT BOTH ENDS, AND TERMINATE IT AT THE TOP OR THE LEFT SIDE WITH A COLUMN LINE BALLOON.

STARTING AT THE TOP LEFT AND MOVING RIGHT, SEQUENTIALLY LETTER COLUMN LINE BALLOONS ACROSS THE TOP OF THE PAGE. AGAIN STARTING AT THE TOP LEFT, SEQUENTIALLY NUMBER THE BALLOONS DOWN THE LEFT SIDE TO THE BOTTOM OF THE PAGE.

COLUMN LINES AND BALLOONS

FIGURE A1–4

LINE SPACING

Line spacings should be at least 0.06 inch to avoid closed-up or blocked-in spaces on microfilm.

LINE PATTERNS

Line patterns should be selected from the eight basic ones:

1. Solid
2. Dotted
3. Long Dash
4. Medium Dash
5. Short Dash
6. Dash Dot
7. Dash Dot Dot
8. Long Dash Short Dash

LINE USAGE

1. Centerline and column lines should extend 1/4-inch beyond a view, or further if necessary, for indicating dimensions. Do not extend them into the space between views or continue them from one view to the next. End column lines with column-line balloons (3/8 inch-diameter circles).

2. In general, if an object has dimensions which are too long to be shown at the scale being used, the object should be broken and the dimensions indicated across the break. Scattering of dimensions across the sheet should be avoided if at all possible.

   The overall dimension and string dimensions should be located sufficiently away from the object drawing to ensure uniformity and clarity, in addition to providing space for any future notations.

   Where several closely spaced parallel lines occur (i.e., pavements, shoulders, curbs, medians), the dimensions are placed between the parallel lines without using arrows. Enlarged details should be used where dimensioning would be congested or crowded.

3. Leader or callout lines are usually drawn at an angle of 30E to 60E whenever possible, with an arrowhead at the drawing feature being annotated and no terminator at the note.

   Leader lines should start at the note with a short line (1/8-inch minimum) parallel to the note's base. Leader lines are then angled before terminating at the appropriate feature with a line terminator. When the note is to the right of the object, the leader line should start with the first word of the note. When the note is to the left of the object, the leader line should start with the last word of the note. Leader lines in the same area should be parallel. Avoid leader lines that are:

   - Horizontal or vertical
   - At the same angle as cross-hatching
   - At very small angles to the terminating surface
   - Parallel to extension or dimension lines
   - Curved
   - Crossed
   - Too long

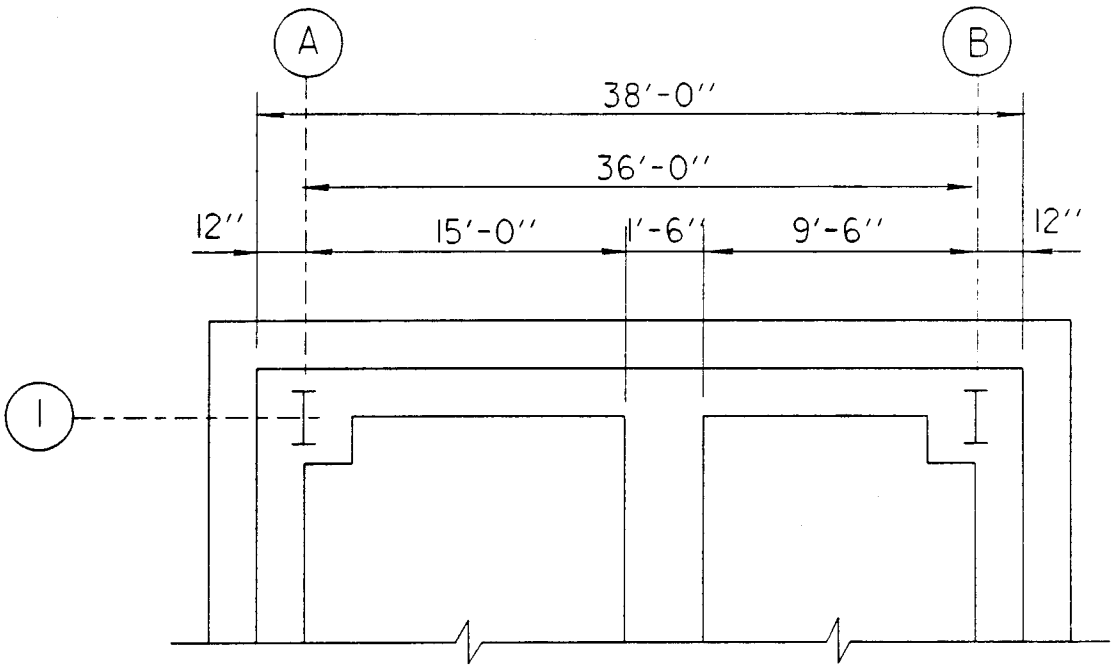
4. Cutting-plane lines should extend beyond the view, and end with horizontally bisected squares (9/16-inch) on one end and arrowhead at the other end of the cutting-plane line.

LINE TERMINATIONS

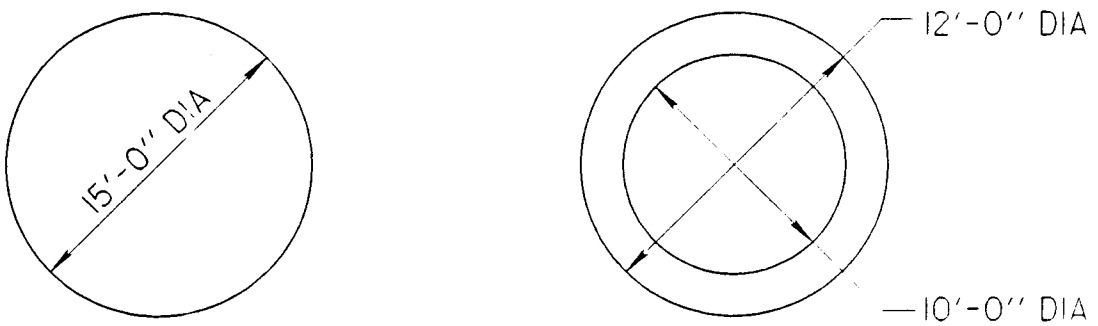
Line terminators should be used on dimension lines, leader lines, and cutting-plane lines. The type of line terminator used depends upon the feature to be emphasized and available space. Line terminators can be one of the following:

- Arrowheads should be used to terminate dimension and leader lines. If a dimension is required inside a space less than 3/8-inch, external dimension lines and arrowheads can be used. (See Figure A1-5.)

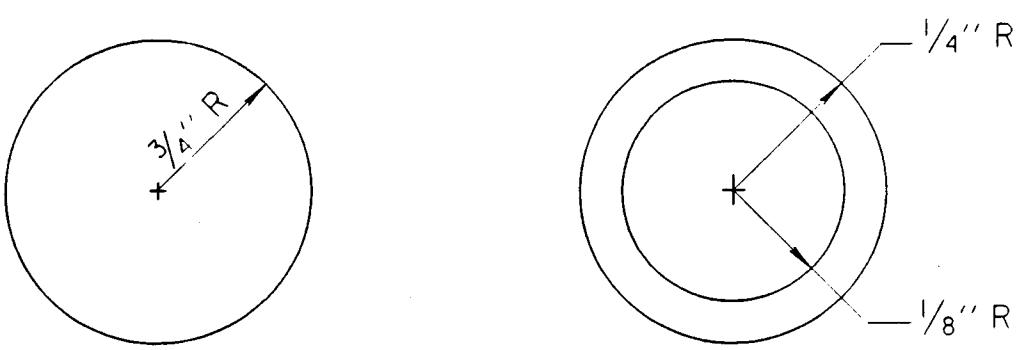
DIMENSIONING DRAWINGS



DIMENSIONING DIAMETERS



DIMENSIONING RADII



DIMENSIONING

FIGURE A1-5

- Slashes should be used to terminate dimension lines inside a space less than 3/8-inch. Slashes are approximately 1/8-inch long.

- Loops should be used to terminate leader lines at reinforcing steel bars, electrical wires, piping, and schematic lines. Their approximate radius is 1/16-inch, and they start and stop one radius from the line identified.

A1.13 VIEWS

Usually, a drawing requires at least two views to adequately describe an area. Complicated areas may need several views including auxiliary views and sections. Some simple areas may require only one view wherein the specification will adequately describe the rest of it.

Views should be oriented within the format so as not to crowd each other, the border, or other data. The placement of auxiliary views should be in proper relation to main views and be complete enough only to explain the detail which made the view necessary. Break lines, tabular identities of similar items, and short word descriptions are permissible as long as clarity is not impaired. The following guidelines should be followed in placing the views:

- The main plan view should be placed in the drawing's upper left corner. If there is more than one plan view, views should be arranged at the top of the drawing in sequence from left to right.

- Sections, details, elevations and schematics (in that order) should be placed directly below the main plan view when space is available; otherwise they should be placed to the right. Sections and details should be displayed in sequential order, always moving from left to right. Whenever possible, views that relate to one another should be grouped on the same drawing.

- View notes should be located 1/4-inch between the lettering and the drawing and should be left-justified.

- Allow 4 to 6 inches between views to insert notes and dimensions, and 2-1/2 inches at the borders.

A1.14 CALL OUTS

This section describes the formats and layout guidelines for call outs on the drawings.

SECTIONS AND DETAILS

If possible, sections and details should be on the same drawings where called out. When shown on a different drawing, section views are placed to the right of plan views. If a drawing shows only sections and details, sections take precedence, and are shown in sequential order from the drawing's top left corner.

When showing a section cut through a plan, refer to Figure A1-6 for the proper arrowheads to show the direction of the cut, the block identifying the section number and the number of the drawing where the section is located.
Figure A1-7 shows a detail call out. The standards for pen size and thickness of arrow should be followed.

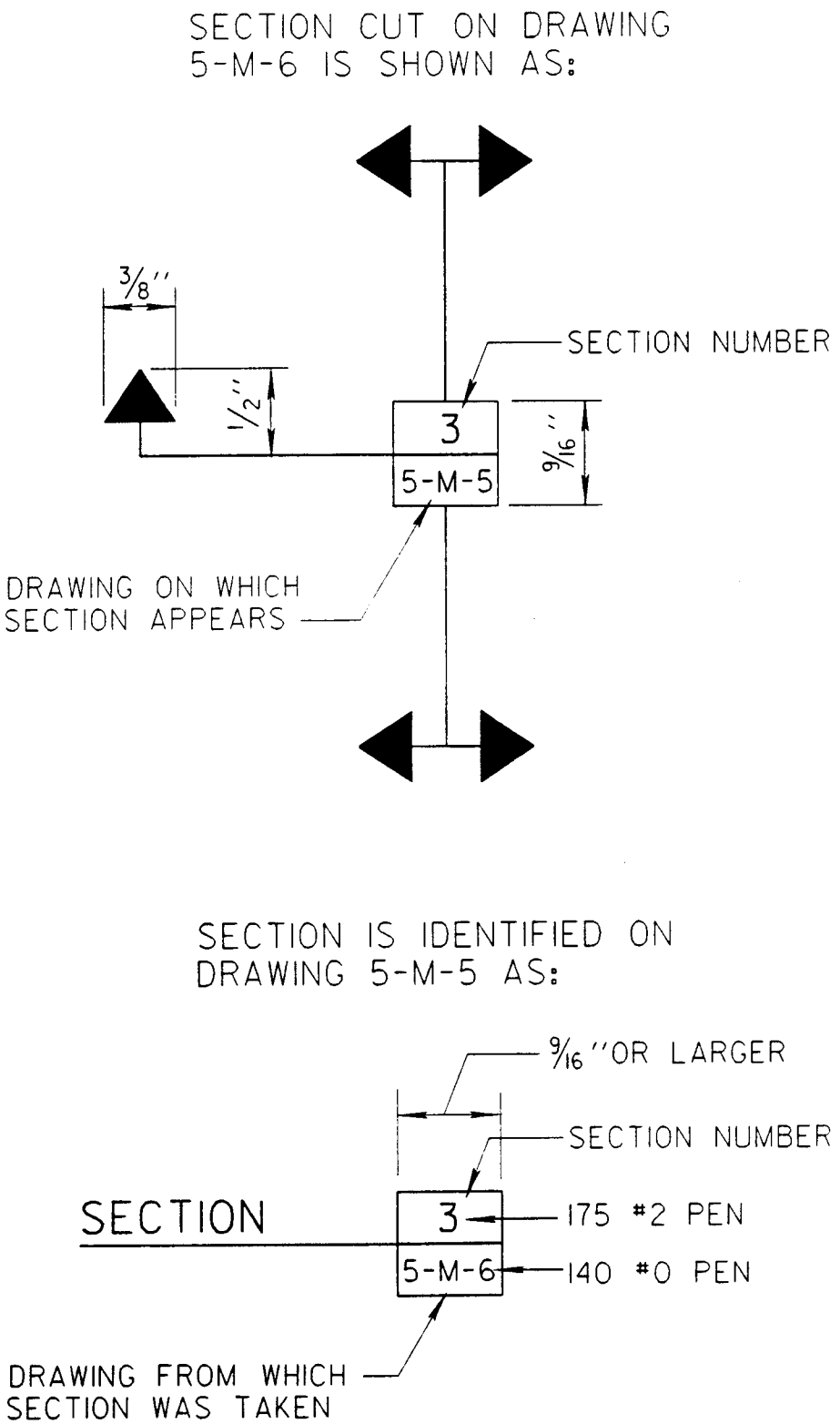
Figure A1-8 shows a standard detail call out.

EQUIPMENT AND PIPING

Equipment and piping call outs should follow Figure A1-9. Equipment and pipe call outs are placed in differently shaped blocks. Criteria for drawing pipes as single or double lines are shown in Table A1-5.

A1.15 NOTES

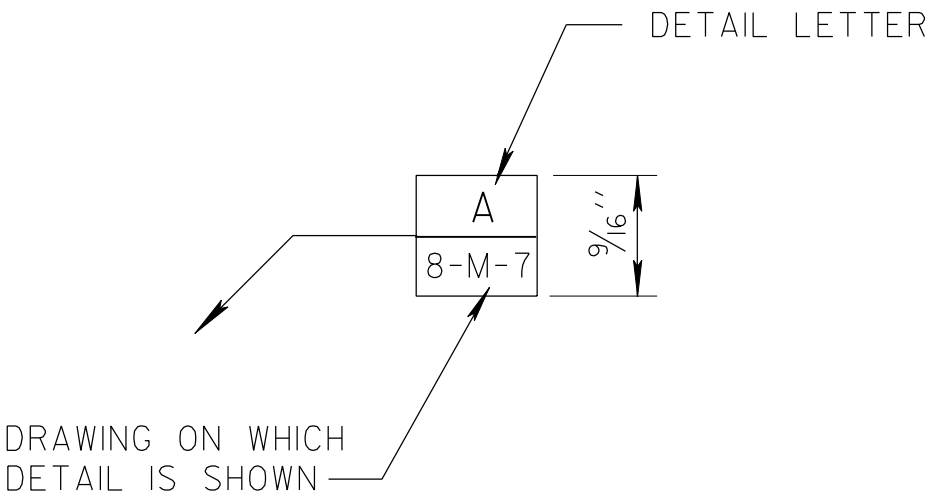
Two types of notes could appear on the drawings; general notes which apply to all the drawings, and view notes which apply to specific features on a specific drawing. The following explains the difference:



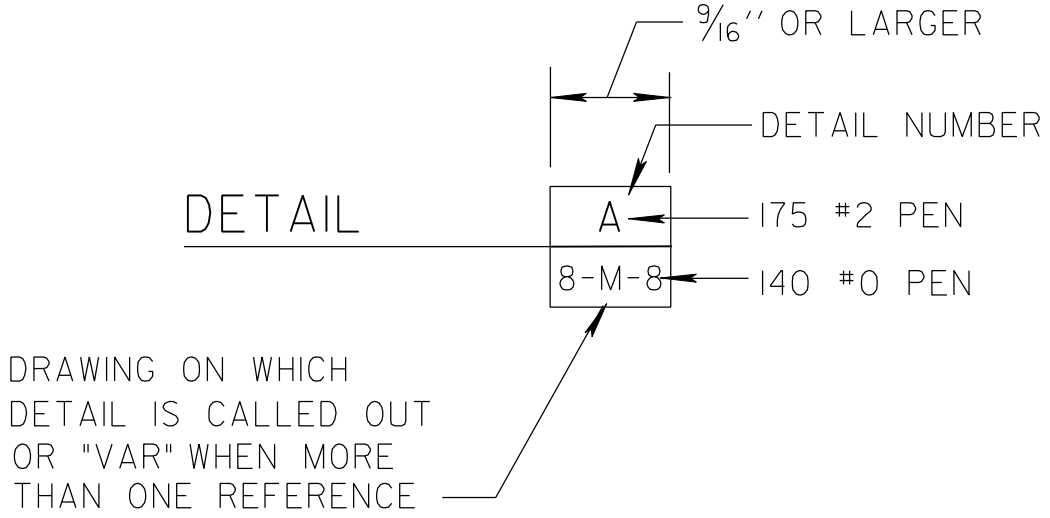
SECTION CALL OUT

FIGURE A1-6

PROJECT SPECIFIC DETAIL IS CALLED OUT
ON DRAWING 8-M-8 AS:



DETAIL IS IDENTIFIED
ON DRAWING 8-M-7 AS:



DETAIL CALL OUT

FIGURE A1–7

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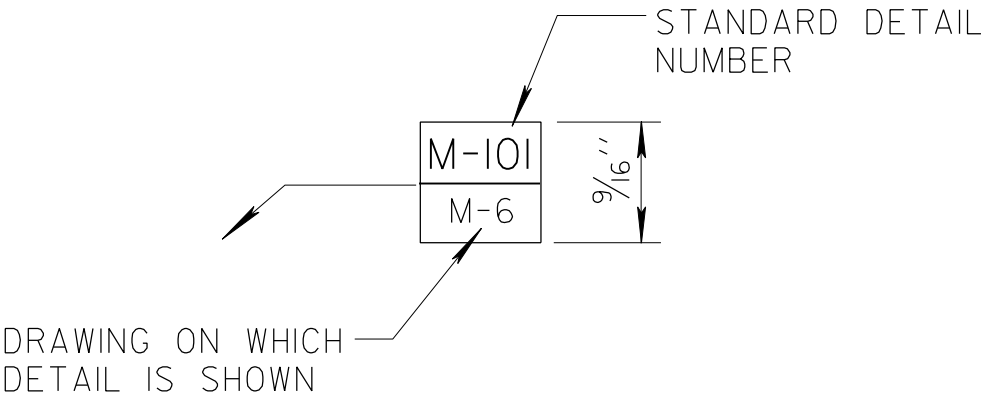
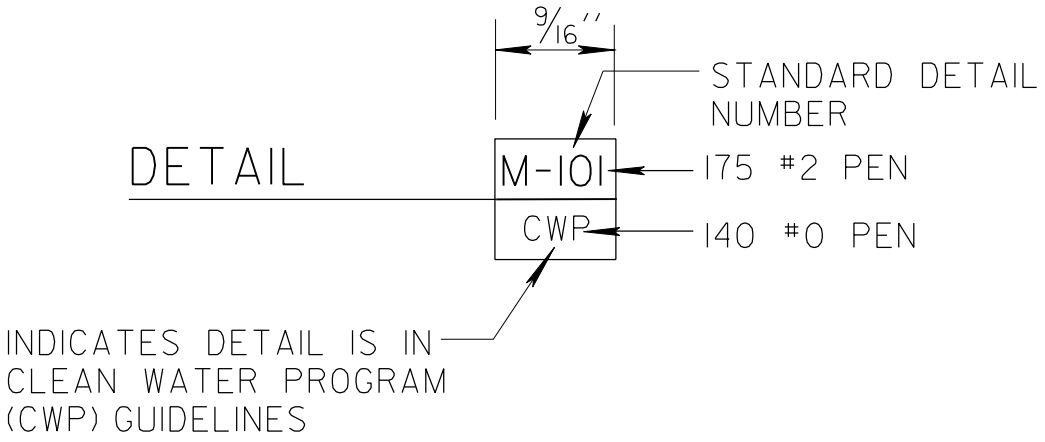
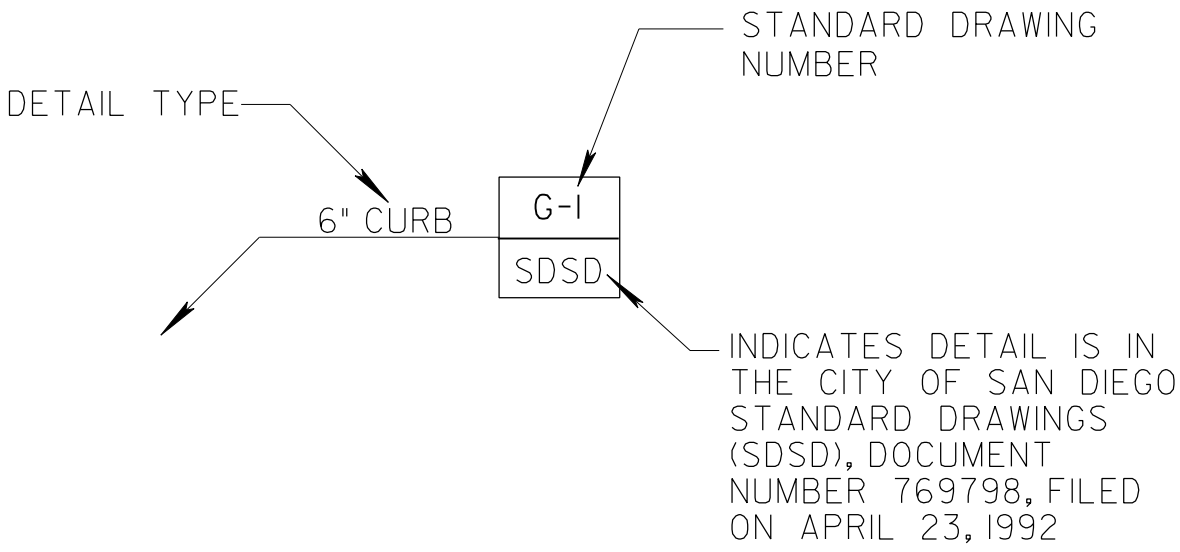
A CLEAN WATER PROGRAM STANDARD DETAIL
IS CALLED OUT ON PLAN OR SECTION AS:



AND IS IDENTIFIED ON DRAWING M-6 AS:



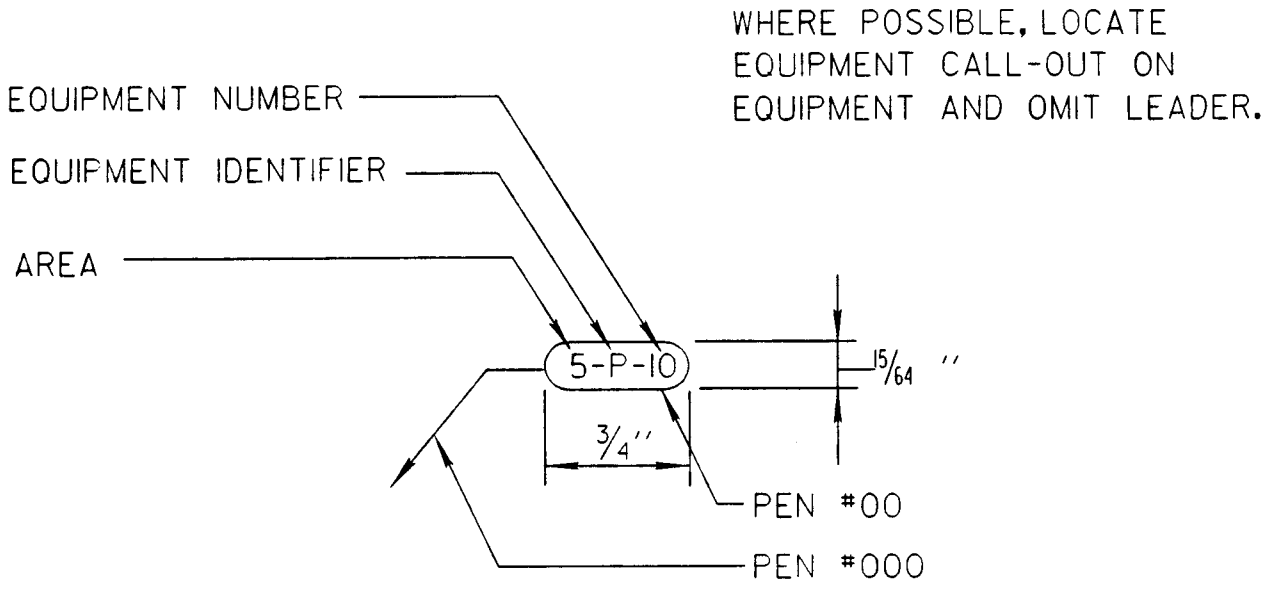
A CITY OF SAN DIEGO STANDARD DETAIL
IS CALLED OUT ON PLAN OR SECTION AS:



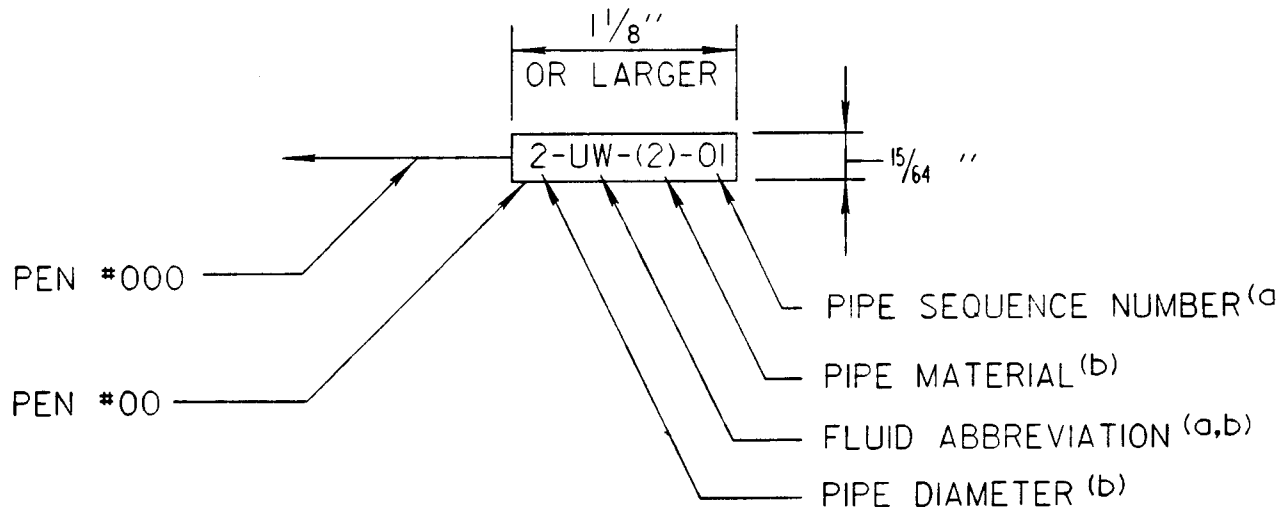
STANDARD DETAIL CALL OUTS

FIGURE A1-8

EQUIPMENT CALL-OUT



PIPING CALL-OUT



(a) THIS ELEMENT WILL BE SHOWN ON P&ID
(b) THIS ELEMENT WILL BE SHOWN ON YARD PIPING AND MECHANICAL DRAWINGS

EQUIPMENT AND PIPING CALL OUTS

FIGURE A1-9

Table A1-5

CRITERIA FOR SHOWING PIPE AS SINGLE OR DOUBLE LINE

Pipe Diameter, in	Scale 1/8	1/4	3/8	1/2
2	S	S	S	S
3	S	S	S	O
4	S	S	O	D
5	S	S	D	D
6	S	O	D	D
8	S	D	D	D
10	S	D	D	D
12	O	D	D	D
14 and larger	D	D	D	D

Note:
S= Single Line
O= DESIGN CONSULTANT Choice
D=Double Line

GENERAL NOTES

General notes convey information common to the components of an entire drawing, process area, discipline or to all the drawings in the package. General notes are presented either on the drawing which they apply to, or Drawing G-2 which is titled "General and Project Notes."

General notes should be placed in a column on the right side of a drawing with single-space lines within each note (1/16-inch apart) and double-space (1/4-inch) between notes. The general note column should be no wider than 5-3/4-inches plus a 1/4-inch margin between the notes and the drawing border, and should be left-justified. Refer to Figure A1-10 for note location information.

VIEW NOTES

View notes (also known as "local notes") show information pertaining to specific drawing features. Lines within each note should be single-spaced, and notes should be separated vertically at least one and one half spaces. One quarter inch should separate the note and the drawing border horizontally. Notes should be left-justified.

View notes should be separated horizontally by at least 1/2-inch. Numbers should be the same height as the letters. See Figure A1-11 for further detail.

A1.16 SEALS/SIGNATURES

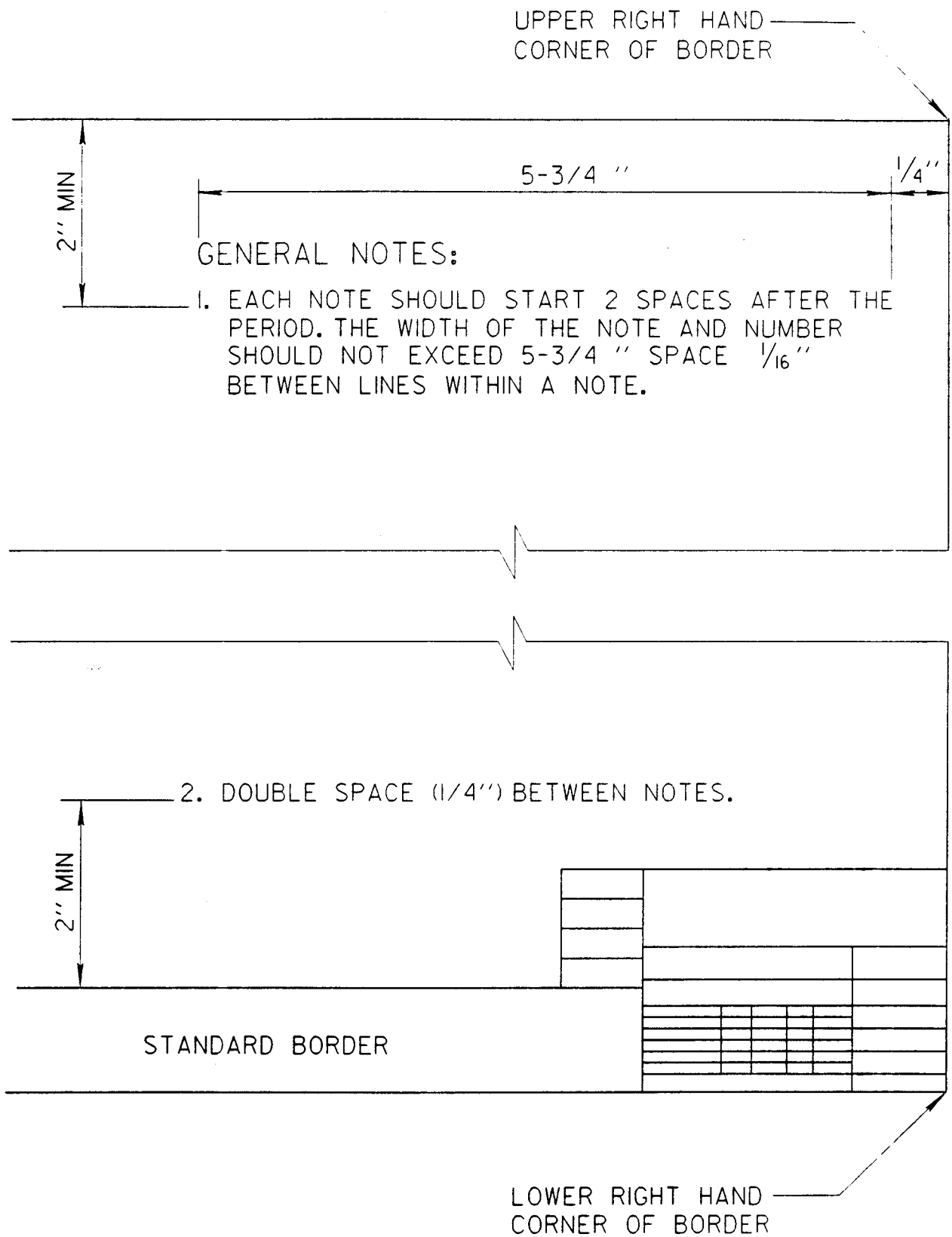
Camera ready drawings, when issued for bidding, will require the stamp of a California registered professional engineer, his or her signature, and the date below the seal. This is normally the responsibility of the discipline manager. Revisions to drawings that have been stamped by a registered professional engineer must be initialed and dated below the stamp or in the revision block column designated for the initials by the same engineer who signed the original work. If this cannot be done, another registered professional engineer can affix his seal to the drawings (or enter his registration number), and enter his signature and the date, noting that his seal covers only the specific revision. All seals must include the license expiration date.

A1.17 OTHER CONVENTIONS

NORTH ORIENTATION

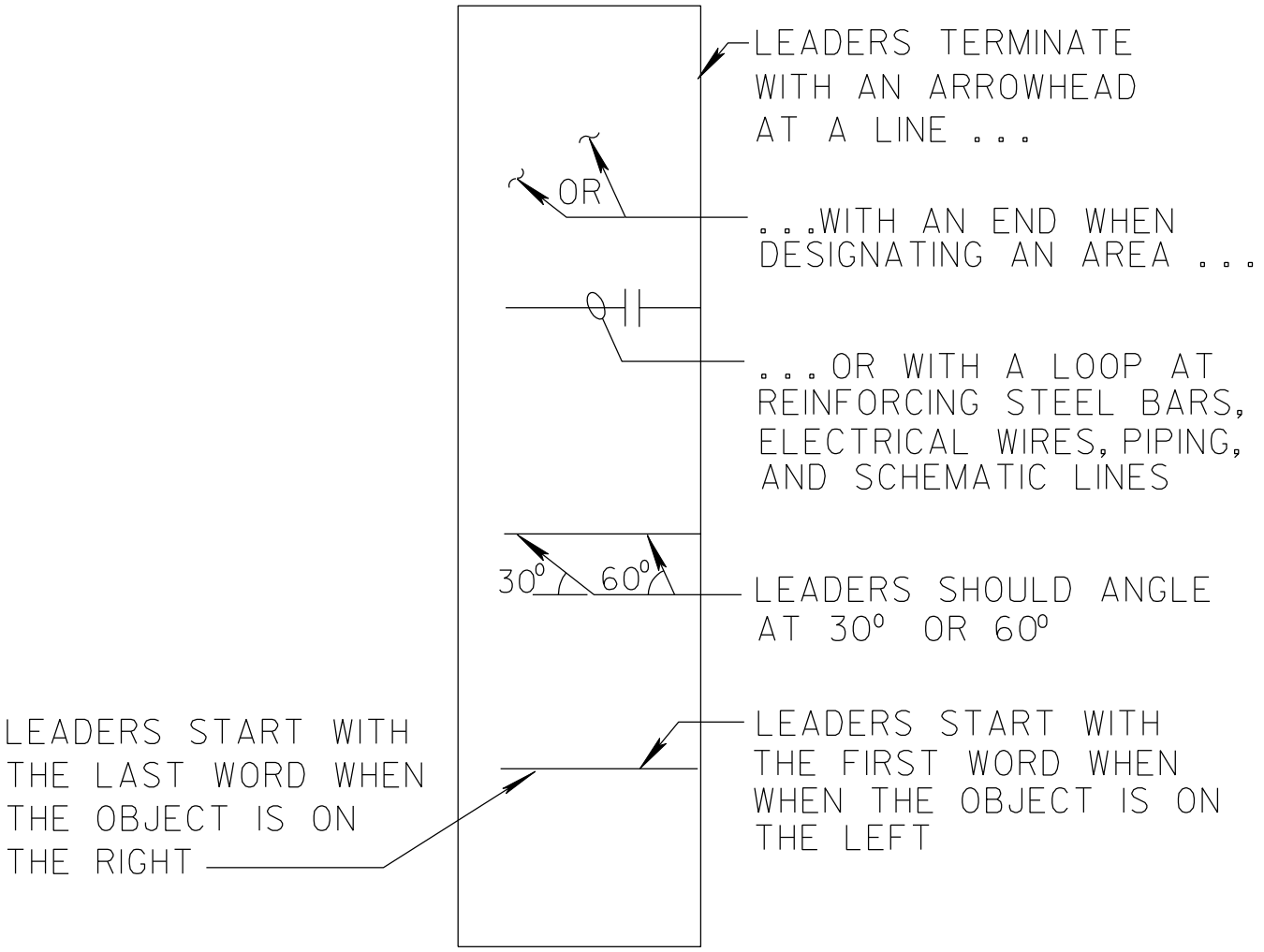
General plans, such as maps and site plans, must always include a north arrow. The project north orientation may be used to show the buildings and other structures squarely on the drawing sheet. In such drawings, the relationship between true north and project north must be shown as on Figure A1-12. The north arrow may point in any direction within plus or minus 90 degrees of vertical.

The same orientation should be maintained for all plans in a series of similar sheets, regardless of discipline. If a plan view will not fit vertically on a drawing sheet, it can be rotated counterclockwise by as much as 90 degrees. If the same orientation is not possible for certain plans within the set, place the note "Plan Orientation Different from Plant Layout" 1/4-inch below the north arrow.



LOCATION OF GENERAL NOTES

FIGURE A1–10



VIEW

ALLOW SINGLE SPACE (1/16'') BETWEEN LINES WITHIN A VIEW NOTE.
ALLOW ONE AND A HALF SPACE (3/16'') BETWEEN NOTES.
ALLOW 6'' BETWEEN VIEWS.

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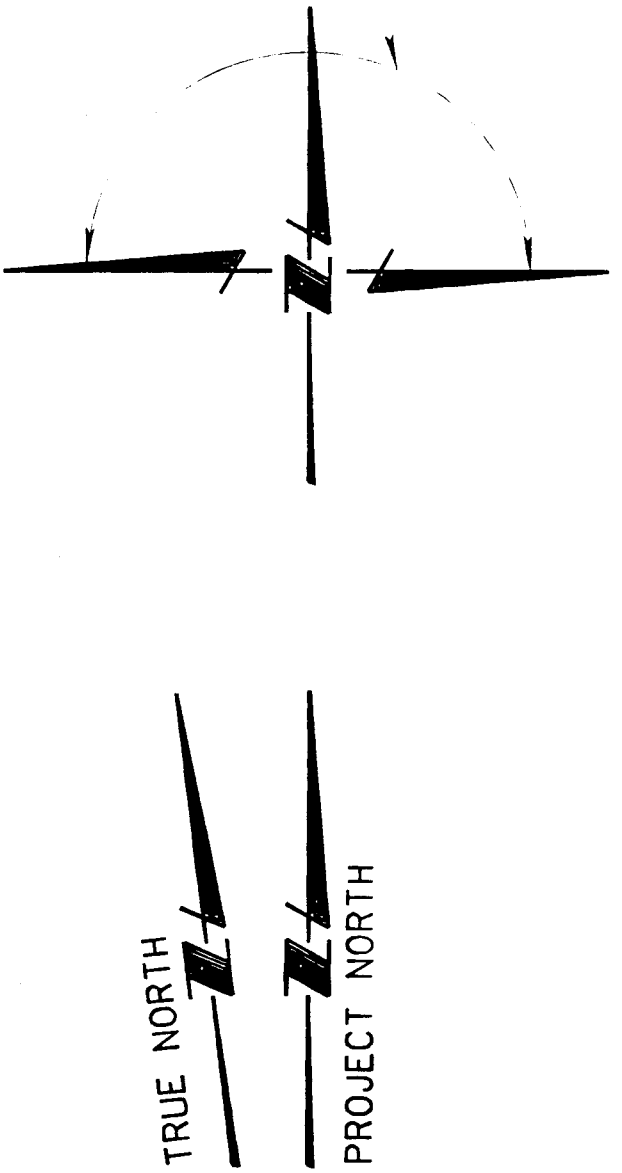
VIEW NOTES AND LEADERS

FIGURE A1–11



NORTH ARROW DIRECTION

FIGURE A1–12

On Plan and Profile Sheets where the lowest elevation of the sewer is shown at the left side of each sheet, stationing is from left to right, and the sewer will be constructed from left toward the right, the north arrow orientation cannot follow the convention above for other sheets. The north arrow must be oriented in whichever direction is dictated by the sewer layout on the page.

The north arrow should be located in the upper left corner of all plans, except Plan and Profile sheets, where it should be near the title block in the lower right corner.

KEY PLAN

A key plan is a small scale layout of the overall site showing by cross-hatching the context of a drawing of a small portion of the site which otherwise might be difficult to identify. Key plans should be placed in the lower right corner. Key plans must be no larger than 4 inches square plus a 1-inch margin on all sides.

SCALES

The Standard Border provides a block for scale information which applies to the entire sheet. It also provides a 1-inch bar to warn that a drawing may not be at its original full size scale.

UNNECESSARY INFORMATION

Do not repeat dimensions except as necessary to relate one drawing or view clearly to another and only if there is no other way to identify location or orientation.

Do not repeat room names or numbers, door or window numbers or material identification. Show these on a larger scale detail or plan.

Do not render elevations, show shadows, or draw all the bricks, shingles or siding. A small area of texture or hatching at corners or a simple detail showing pattern and direction tells everything necessary. Cross hatching need not cover an entire wall or area in plan.

Do not draw interior elevations in which walls are blank.

Do not detail casework except for very unusual features. Draw elevations only and call out dimensions when necessary.

Do not use the term "By Others." Use "By Owner" or "NIC," meaning "Not In Contract."

GENERAL DRAWING INFORMATION

Use multiple partial plans with match lines on projects where complexity demands it.

Provide only the kinds of information which relates clearly to the specifications. Designate items by generic names, not trade names, i.e., Gypsum Board, not Sheetrock.

Call out specific details of materials such as hardwood species, aluminum finish, or gypsum only when they cannot be clearly identified or described in schedules and specifications.

DRAWING CHANGES

Changes made to drawings during design do not lead to any revision notations on the border. The drawing status block on the border is intended for formal changes made by addendum during the bid phase and for recording "as-built" information.

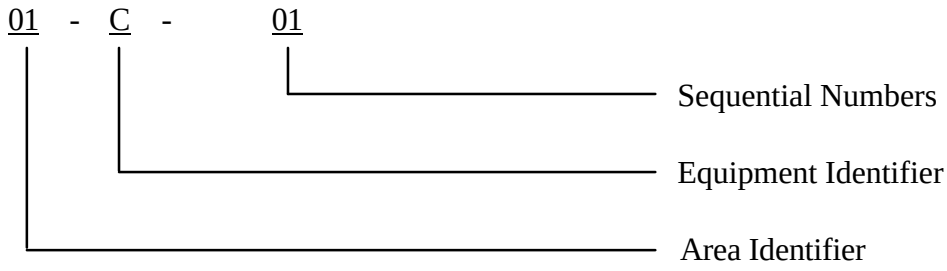
A change is noted by describing it in the revision block, circling the revised area on the drawing, and placing the revision letter or number in a triangle inside the circled area.

A1.18 NUMBERING SYSTEMS

This section describes the numbering system that will be used for drawings and components of systems. Components include equipment, piping, valves, motors, circuit breakers, controls, protective devices, instruments, alarms, wire, and all other devices necessary to make up a complete system which can be functionally tested and operated.

EQUIPMENT NUMBERING

The purpose of equipment numbering is to uniquely identify each piece of equipment in the facility. The equipment number will consist of three elements: process area, equipment ID, and a sequence number.



First Element (Area Identifier): The area identifier is a two digit number according to the numbering system explained in Section A1.4.

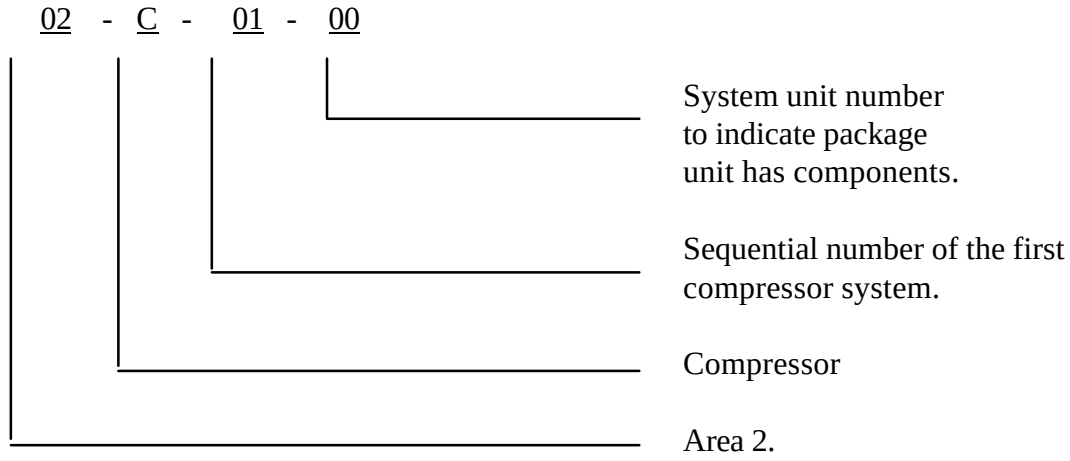
Second Element (Equipment Identifier): The equipment or package identifier is an alpha designator. Mechanical and electrical equipment identifiers are found in Table A1-6. Instrumentation will be identified by ISA nomenclature.

Third Element (Equipment Sequential Number): The equipment sequential number is a two or three digit number used to identify specific equipment within a process area.

The sequence for equipment numbers should be assigned following the direction of flow.

Component Identifiers: A fourth element can be added after the sequential number element when individual components of an equipment system must be numbered. Component identifiers should be assigned by setting the number for the overall system as 00 and numbering the components as 01, 02, etc., according to the DESIGN CONSULTANT'S judgment.

An equipment number for a compressor system in Area 2 would be:



An equipment number for component 1 of the compressor system in Area 2 would be:

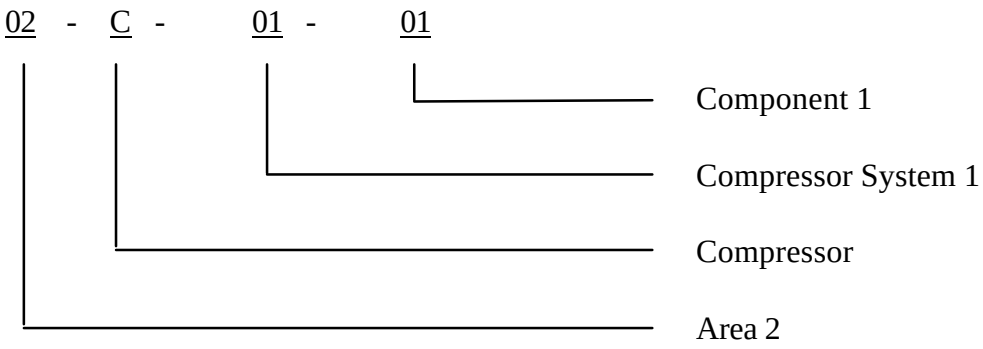


Table A1-6

MECHANICAL AND ELECTRICAL EQUIPMENT IDENTIFIERS

Letter Designator	Group Description
A	Mixing Equipment
AF	Air Filters
AHU	Air Handling Units
AS	Acoustic Silencers
B	Boilers

Table A1-6

MECHANICAL AND ELECTRICAL EQUIPMENT IDENTIFIERS (Continued)

Letter Designator	Group Description
C	Compressors
CAC	Computer Room Air Conditioners
D	Dewatering Equipment
E	Engines
F	Fans, Blowers
FCV	Flow Control Valves
G	Gates
H	Heat Exchangers
HV	Manual, Check Valves
LP	Lighting Panel
MCC	Motor Control Centers
O	Conveyors
P	Pumps
PCV	Pressure Control Valves
PP	Power Panels
T	Tanks
TCV	Temperature Control Valves
V	Valves
Y	Expansion Joints
ME	Miscellaneous Equipment

EQUIPMENT SCHEDULES

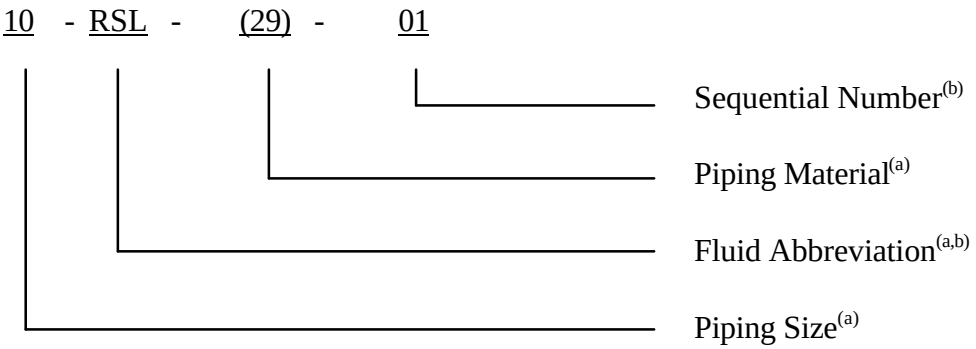
Major pieces of equipment may be listed on schedules when the contract requires multiple units. Schedules refer to locations on the drawings and in the specifications where more complete information is given.

Schedules on the drawings should list:

Equipment number
Equipment name, type, and size
Type of service
Drawing where shown in plan
Specification section

PIPE LINE NUMBERING

The purpose of pipe numbering is to uniquely identify each pipe in the facility. Each pipe number will consist of four elements. The first element represents the pipe size in inches. The second element identifies the fluid flowing in the pipe. The third element represents the material of the pipe and type of fittings as a group. Fluid abbreviations and piping group numbers are listed on Standard Drawing M-1, the Piping Schedule, in Volume IV, Section A-3. The fourth element represents the sequential number.



(a) This element should be used on piping callouts on mechanical drawings.
(b) This element should be used on piping callouts on P&ID drawings.

When the sequential number is used, the following guidelines should be followed:

Process Piping

- Assign a separate number to each line.
- Assign a single number to all drains or vents from one piece of equipment.

- Assign a separate number to each drain and vent line from different pieces of similar equipment. If manifolded together, assign one number to the entire manifold.

- Assign a bypass pipe the same number as the inlet and outlet headers if the bypass line has a single valve. However, if the bypass line has two valves, assign a separate number to the pipe between valves.

- Assign a separate number to each pipe on multiple pipes between two pieces of equipment.

- Assign a separate number to each header.

- Assign the same number as the main piping run up to the isolation valve on a branch of the main run.

- Assign separate number for each significant temperature or pressure change in the line.

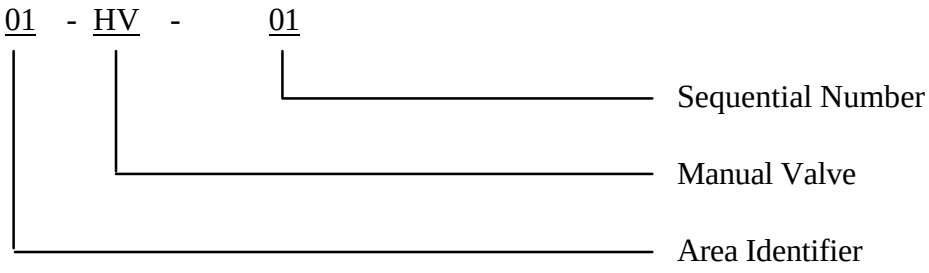
- Assign separate numbers for each material class.

- Assign separate numbers when a pipe changes sizes.

VALVE NUMBERING

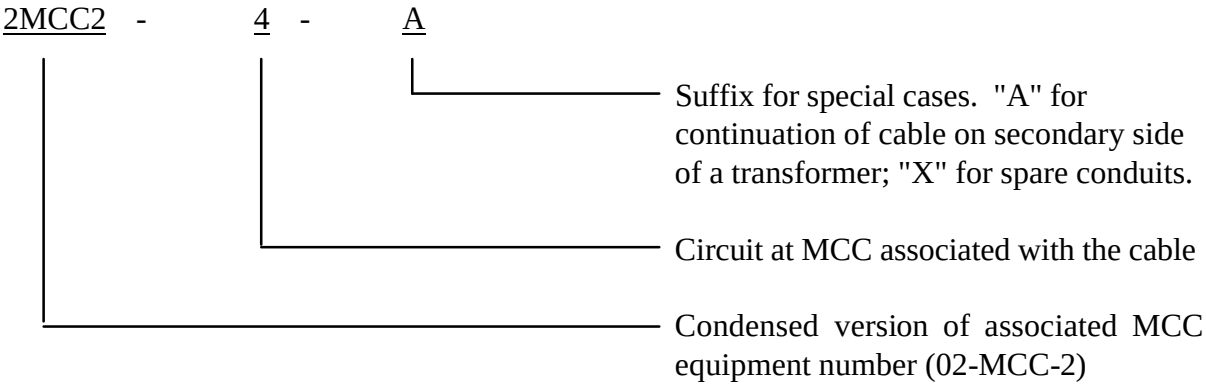
All valves should be identified as to type and numbered according to the ISA system. Only instrument air valves are excluded.

For example, the first manual valve in Area 1 would be:

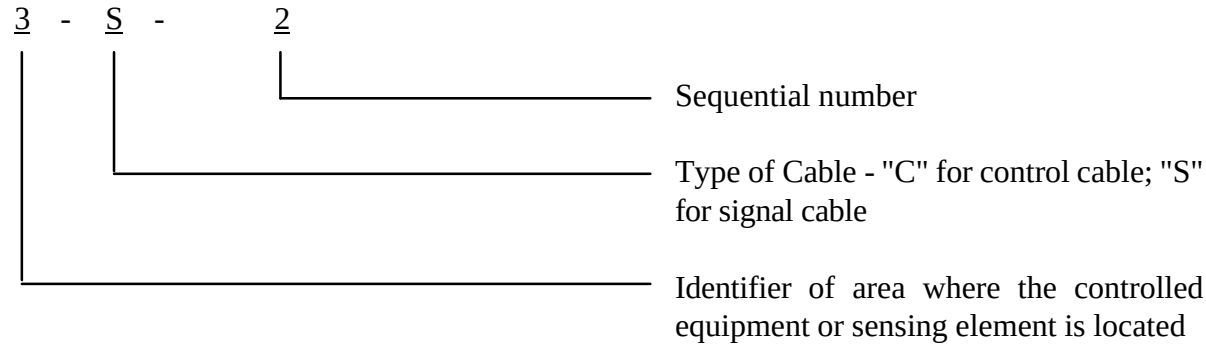


CABLE NUMBERING

Power, control and signal cables shall each be assigned a unique identification number. Power cable shall be identified using the following system:



Control and signal cable shall be identified using the following system:



INSTRUMENT AND LOOP NUMBERING

Each instrument should be designated by an alphanumeric number consisting of area location, functional identification letters and a loop number. The following guidelines should be followed in numbering instruments and loops.

- Identification of an instrument should be according to its function. For example, a differential-pressure recorder used for flow measurement should be functionally identified as "FR"; a pressure indicator and a pressure-actuated switch connected to the output of a pneumatic level transmitter should be functionally identified as "LI" and "LS", respectively.

- The first letter of the functional identification should be selected according to the measured or initiating variable, not the manipulated variable. For example, a control valve which varies flow in response to a level controller should be functionally identified as "LCV" not "FCV".

- The succeeding letters of the functional identifiers should designate one or more readout or passive functions and/or output functions. A modifying-letter may be in addition to one or more succeeding letters. Modifying-letters may modify either a first letter or succeeding letters. For example, "TDAL" contains two modifiers; the "D" changes the measured variable "T" into a new variable, "temperature differential." The letter "L" restricts the readout function "A" to represent a low alarm only.

- The sequence of the functional identifier begins with one letter which designates the measured or initiating variable. Readout or passive letters may follow in any order with output functional letters following these in sequence except that output letter "C" (control) precedes output letter "V" (valve), i.e., "PCV", a pressure control valve. When modifying-letters are used, they should be interposed so that they immediately follow the letters they modify.

- A multiple function device should be symbolized by showing a bubble for each measured variable, output, and function. For example, a temperature controller with an integral switch is symbolized by two tangent bubbles - one functionally identified as "TC" and the other as "TSH". The instrument is functionally identified as "TC/TSH" in the specifications.

- The number of functional letters used for any one instrument must not exceed four. The number of functional letters should be kept to a minimum by arranging the functional letters into subgroups or by omitting the "I" (indicate) if an instrument both indicates and records the same measured variable. All letters in the functional identifiers must be upper case.

- Each instrument loop must have a unique number which is not assigned to any other loop at the facility. Each instrument in a loop must have the same loop number.

- An instrument common to two or more loops must carry the identification of the loop which is considered predominant.

- Loop numbering shall be serial, using a single sequence of numbers regardless of the loop function. A leading digit shall incorporate the area number with which the loop is associated. For example, loops in area 4 would be numbered:

  TIC - 4001
  FRC - 4002
  LIC - 4003

- If a loop has more than one instrument with the same function, a suffix shall be appended to the loop number according to the following:

  (1) Use only an upper case letter
  (2) Alternate letters and numbers for further loop subdivisions

For example, the primary elements for a multipoint temperature recorder would be:

TE - 25A
TE - 25B
TE - 25C

- Instrument accessories such as purge meters, air sets, and seal pots that are not explicitly shown on a drawing, but which need a designation for other purposes should be tagged according to their function using the same loop identification as the instruments they directly serve. For example, an orifice flange union associated with orifice plate "FE-7" should be tagged "FX-7". A thermowell used with thermometer "TI-9" would be "TW-9."

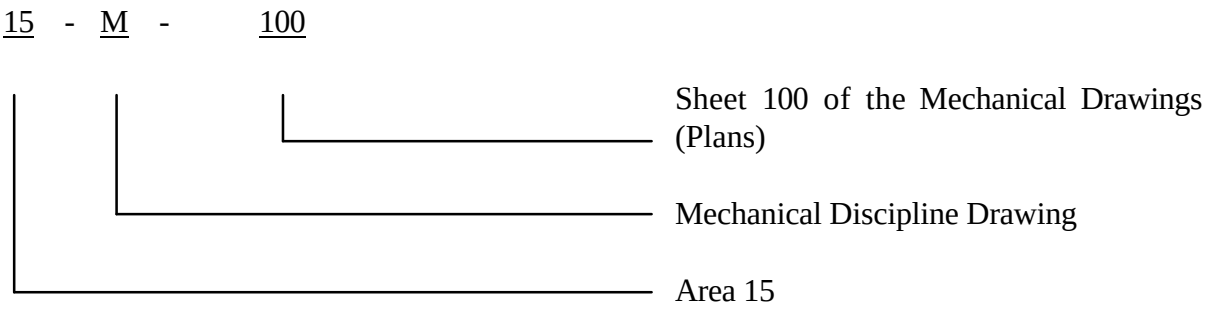
DRAWING NUMBERING

Drawings are numbered to identify the area covered, the discipline involved, and the sheet number. Detail sheets are numbered as indicated in paragraph A1.19.

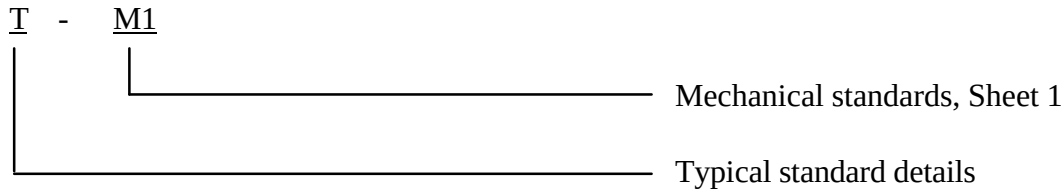
Use the following system to assign sheet numbers:

Sheet No. Series	Subject
100	Plans
200	Sections
300	Elevations
400	Details
500	Schedules

An example is:



Typical standard detail sheets are identified by discipline and sheet. For example:



Discipline designators are shown in Table A1-7.

Table A1-7

DISCIPLINE DESIGNATORS

Discipline	Prefix
General	G
Demolition	D
Civil	C
Landscape	L
Architectural	A
Structural	S
Mechanical	M
HVAC	H
Electrical	E
Instrumentation	I
Typical Standard Details	T

A1.19 SEQUENCE OF DRAWINGS

Drawings are arranged in the volume of contract drawings according to the following:

General Drawings

Title Sheet
List of Drawings
Overall Site Plan
General and Project Notes
Fluid Abbreviations
Standard Abbreviations
Symbols
Traffic Control Notes and Index
Design Criteria
Flow Diagram
Hydraulic Profile

After the General Drawings, drawings shall be sequenced first by area, second by discipline within the area, and third by sheet sequence within the discipline. Subjects within the disciplines shall be arranged according to the following:

Demolition Drawings

Civil Drawings

Civil Plans, Plans and Profiles
Civil Details

Irrigation and Landscaping Drawings

Irrigation Plans
Irrigation Details

Landscaping Plans
Landscaping Details

Architectural Drawings

Architectural Plans, Sections and Elevations
Architectural Details
Architectural Schedules

Structural Drawings

Structural Plans and Sections
Structural Details

Mechanical Drawings

Mechanical Plans and Sections
Mechanical Details
Equipment Schedules

HVAC Drawings

HVAC Schematics
HVAC Plans and Sections
HVAC Details
HVAC Schedules

Electrical Drawings

Electrical Plans
Electrical Details
Electrical Schedules
Electrical Diagrams

Instrumentation Drawings

Piping and Instrumentation Diagrams
DCS Interface Diagrams
Panel Drawings

The standard details should be arranged at the end of the drawing package, according to the following:

Typical Standard Details	Drawing Nos.
Standard Civil Details	T-C1, T-C2, etc.
Standard Architectural Details	T-A1, T-A2, etc.
Standard Structural Details	T-S1, T-S2, etc.
Standard Mechanical Details	T-M1, T-M2, etc.
Standard HVAC Details	T-H1, T-H2, etc.
Standard Electrical Details	T-E1, T-E2, etc.
Standard Instrumentation Details	T-I1, T-I2, etc.

A1.20 MICROFILM REPRODUCTION

All drawings must be capable of producing acceptable prints when enlarged from 35mm microfilm records. Special attention must be given to avoid the following problems that cause poor microfilm quality:

- Inconsistent line weight and density
- Lettering that is fuzzy or too small
- Incomplete erasures from changes
- Smudges, dirt, stains, wrinkles and creases resulting from careless handling
- Insufficient space between lines and letters
- Overdrafting, such as excessive cross hatching and shading
- Drawings made to excessively small scales

A1.21 DISCIPLINE SPECIFICS

This section elaborates on the content of the drawings produced by the various disciplines.

COVER SHEET

The standard cover sheet for volumes of CWP drawings is shown in Volume IV, Section A3. The DESIGN CONSULTANT will place the Vicinity and Location Maps on the cover sheet.

GENERAL DRAWINGS

General drawings present information which relates to the overall project, not to any single discipline. They are numbered in sequence.

Overall Site Plan

This drawing, numbered G-1 in every project, shows the entire project site. If the project site is too large to be shown with the necessary level of detail, the Overall Site Plan can be used as a Key Map.

- All individual structures or process units must be identified. If the scale is small enough to prevent adequate size lettering, a structure or process numbering index should be utilized.
- The grid system must be shown on this plan along with the basis of bearing and any adjustment to plant north.
- The bench mark reference is also shown on this plan.
- The boundary of the property is shown with bearings and distances or coordinates.

Figure A1-13 is an example of an Overall Site Plan.

General and Project Notes

This sheet presents information to the contractor on the Standard Specifications for Public Works Construction, the Standard Drawings, and other requirements. It is designated as Sheet G-2 in every project.

Fluid Abbreviations

This sheet gives the contractor the abbreviations to be used for fluids on the drawings. It is Sheet G-3 in every contract where fluids are abbreviated.

Standard Abbreviations

These sheets list all the other abbreviations used on the drawings. The Standard Abbreviations sheets are numbered G-4 through G-7 (and higher if more drawings are used).

Symbols

The symbols sheets show all the symbols used on the drawings. The symbols sheets are numbered R-1 through R-7 (and higher if more are used).

Traffic Control Notes and Index

This sheet, always numbered T-1 in contracts where it is used, lists Contractor requirements for general control of traffic at the site and indexes any plan sheets used to define specific traffic controls. Additional traffic control plans are numbered T-2, etc.

List of Drawings

The sheet index must contain the Designer-s drawing number, the corresponding drawing title, and the corresponding D-Sheet number for each drawing in the project package. The List of Drawing sheets is numbered LD-1, LD-2, etc.

Design Criteria

This sheet lists the unit process design criteria for the project. The criteria for a treatment facility may cover an entire sheet or more. Figure A1-14 is an example. Design Criteria sheets are numbered DC-1, DC-2, etc.

Flow Diagram

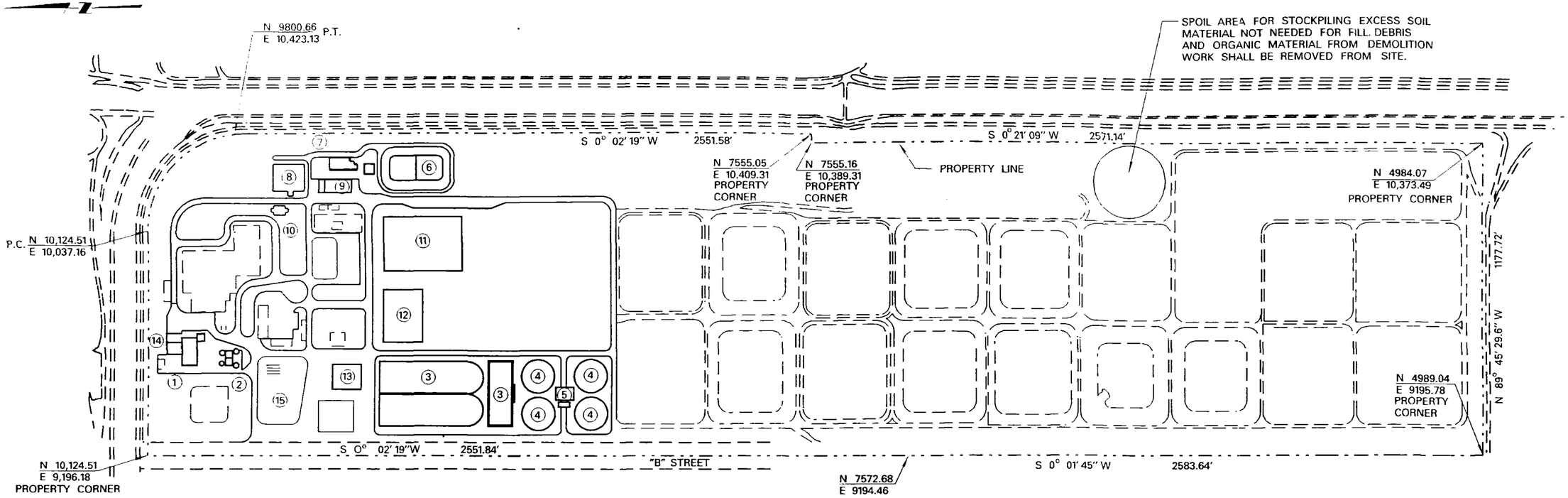
This schematic drawing shows where the liquids flow, and how the treatment equipment is arranged. Symbols are used exclusively. Major mechanical equipment is shown and labeled; major valves and instruments are shown but are not labeled. Flow diagrams are used for treatment facilities. Flow Diagram sheets are numbered FD-1, FD-2, etc.

Hydraulic Profile

Hydraulic profiles show water level elevation throughout the treatment process from plant influent to effluent. Levels at peak and average flow rates should be depicted. Inverts and soffits of hydraulic elements and weir crest elevations shall be called out and depicted accurately, and widths and lengths shall be called out below each profile. Add notes to clarify how many influent screens and tanks of each process are out of service for each profile condition shown. Add notes, similar to the profile elevation call outs, below each process unit to indicate the applicable process unit flow rates for each of the profiles. Submit detailed hydraulic profile calculations to MWWD for the record. Hydraulic profiles are numbered HP-1, HP-2, etc.

Piping Schedule

The Piping Schedule, Sheet M-1 in all contracts where it is used, relates piping materials and fittings to piping material codes.



SITE PLAN

FACILITIES INDEX REFERENCE

NO.	FACILITY
(1)	INFLUENT PUMP STATION
(2)	GRIT CHAMBERS
(3)	BARDENPHO PROCESS
(4)	SECONDARY CLARIFIER
(5)	RAS /WAS PUMP STATION
(6)	EQUALIZATION BASINS AND FILTER INFLUENT PUMP STATION
(7)	FILTERS
(8)	CHLORINE CONTACT TANKS
(9)	CHEMICAL BUILDING
(10)	TERTIARY EFFLUENT PUMP STATION
(11)	FLOCCULATION BASINS
(12)	SLUDGE DEWATERING BUILDING
(13)	POWER AND BLOWER BUILDING
(14)	MCC BUILDING – INFLUENT AREA
(15)	MCC BUILDING – SLUDGE PUMPING AREA

BASIS OF BEARINGS AND COORDINATES

BEARINGS ARE BASED UPON THE SOUTH LINE OF THE EXISTING SECONDARY CLARIFIERS AS N 90° 00' 00" E.

COORDINATE SYSTEM IS BASED ON THE SW CORNER OF THE EXISTING SECONDARY CLARIFIERS BEING N9672.00, E9870.00 THIS DATA IS FROM CONTROL SURVEY BY SUN SURVEYS FOR THE FOURTH EXPANSION DATED 12-1-86.

SITE PLAN PROPERTY BOUNDARY INFORMATION IS FROM LEGAL DESCRIPTION. (SEE SHEET C-5)

BENCH MARK

BRASS CAP SET ON THE TOP OF LANDING OF STEPS AT SW CORNER OF AERATION BASINS +20' WEST OF PUMP STATION STAMPED EL. 1460.23.

DRAWING NO.
SHEET NO.
CIP NO.
SPECIFICATION NO.

EXAMPLE
OVERALL SITE PLAN
FIGURE A1-13

CITY OF SAN DIEGO, CALIFORNIA
SHEET OF SHEETS

WATER W.O.
SEWER W.O.

CWP DIRECTOR DATE
DEPUTY DIRECTOR
DESIGN ENGINEER
CONTROL CERTIFICATION
LAMBERT COORDINATES

DESCRIPTION	BY	APPROVED	DATE	FILMED

CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

-D

WARNING
0 ½ 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

SCALE HORIZONTAL 1"=200'
VERTICAL 1"=200'

CLEAN WATER PROGRAM
for Greater San Diego

DRAWING STATUS

NO.	DATE	REQ.	REVISION DESCRIPTION	DRAWN	CKD	APD	PE	EM	DA/OC

/usr/c
13-FEL
ater/prj/pas/draft/a1_13.dgn jcd
32 17:23

PLANT INFLUENT LOADING

DESCRIPTION	UNITS	VALUE
PLANT FLOW		
AVERAGE	MGD	10
PEAK	MGD	20
WASTE CHARACTERISTICS		
BOD5	MG/L	240
SUSPENDED SOLIDS	MG/L	190
TKN	MG/L	45
NH3-N	MG/L	24
TOTAL P	MG/L	11
PO4-P	MG/L	8
PH	—	8
TEMPERATURE	OC	21-27

DISCHARGE CRITERIA

DESCRIPTION	UNITS	VALUE
DISCHARGE CRITERIA		
BOD5	MG/L	20
SUSPENSION SOLIDS	MG/L	20
TURBIDITY	TU	2
COLIFORMS	NO/100ML	2.2
TOTAL CHLORINE RESIDUAL	MG/L	0.1
TOTAL INORGANIC NITROGEN	MG/L	1.5
TOTAL PHOSPHOROUS	MG/L	1.0

INFLUENT PUMP STATION AND HEADWORKS

DESCRIPTION	UNITS	VALUE
HEADWORKS		
FLOW, AVERAGE	MGD	22
FLOW, PEAK	MGD	44
MECH. SCREENS	NO.	3
MANUAL SCREENS	NO.	1
SEWAGE LIFT PUMPS		
FLOW, AVERAGE	MGD	6
FLOW, PEAK	MGD	12
NUMBER	—	3
TYPE	—	VERTICAL NON-CLOG VARIABLE SPEED
CAPACITY (EACH)	GPM	4,200

GRIT REMOVAL

DESCRIPTION	UNITS	VALUE
GRIT CHAMBERS		
NUMBER	—	1
TYPE	—	NON-AERATED
DIAMETER	FT	18
GRIT PUMPS		
NUMBER	—	2
TYPE	—	RECESSED IMPELLER
CAPACITY	GPM	430

SECONDARY TREATMENT FACILITIES

DESCRIPTION	UNITS	VALUE
BARDENPHO PROCESS		
NUMBER OF TRAINS	—	1
TOTAL DETENTION TIME	HR	25.2
FERMENTATION STAGE		
NUMBER	—	1
VOLUME	MIL GAL	0.5
DETENTION TIME	HR	2
MIXER TYPE	—	RADIAL BLADE TURBINE
FIRST ANOXIC STAGE		1
NUMBER	—	1.1
VOLUME	MIL GAL	4.4
DETENTION TIME	HR	RADIAL BLADE TURBINE
MIXER TYPE	—	
NITRIFICATION STAGE		
NUMBER	—	1
VOLUME	MIL GAL	3.6
DETENTION TIME	HR	14.3
AERATOR TYPE	—	SURFACE TURBINE
AERATORS PER STAGE	—	3
AERATION CAPACITY PER STAGE	LBO2/HR	760
INTERNAL RECYCLE RATE	%	400
SECOND ANOXIC STAGE		
NUMBER	—	1
VOLUME	MIL GAL	1.0
DETENTION	HR	4
MIXER TYPE	—	RADIAL BLADE TURBINE
REAERATION STAGE		
NUMBER	—	1
VOLUME	MIL GAL	0.14
DETENTION TIME (MIN)	HR	0.5
AERATION TYPE	—	DIFFUSED AIR
AERATION CAPACITY	LBO2/HR	48
SECONDARY CLARIFIER		
NUMBER	—	2
TYPE	—	SUCTION TYPE
DIAMETER	FT	125
SIDE WATER DEPTH	FT	14
SURFACE OVERFLOW RATE (AVG. FLOW)	GPD/SQ FT	280
DETENTION TIME (AVG. FLOW)	HR	9.0
SOLIDS LOADING (AVG. FLOW)	LB/SQ FT/DAY	16
SOLIDS LOADING (PEAK FLOW)	LB/SQ FT/DAY	24

SECONDARY TREATMENT FACILITIES (CONT'D.)

DESCRIPTION	UNITS	VALUE
RAS/WAS PUMP STATION		
RAS PUMPS		
NUMBER	—	3
TYPE	—	HORIZONTAL NON-CLOG
CAPACITY (EACH)	GPM	2100
SLUDGE RECYCLE RATE	% OF FLOW	50-100
WAS PUMPS		
NUMBER	—	2
TYPE	—	ROTARY LOBE
CAPACITY(EACH)	GPM	450

TERTIARY TREATMENT FACILITIES

DESCRIPTION	UNITS	VALUE
DESIGN AVERAGE FLOW	MGD	6
DESIGN PEAK FLOW	MGD	6
EQUALIZATION BASINS		
VOLUME PROVIDED	% OF FLOW	40%
NUMBER OF BASINS		2
VOLUME	MG	2.4
FILTER INFLUENT PUMP STATION		
NUMBER OF PUMPS	—	3
TYPE	—	VERTICAL AXIAL FLOW
DRIVE CONFIGURATION	—	VARIABLE SPEED
CAPACITY (EACH OPERATED SIMULTANEOUSLY)	GPM	3000
FLOCCULATION BASINS		
NUMBER OF BASINS		1
STAGES OF FLOCCULATION/BASINS		2
FLOCCULATOR TYPE		VERTICAL SHAFT
MIXING ENERTY (G)	SEC-1	15-90
TERTIARY FILTERS		
NUMBER OF CELLS		6
TYPE		DEEP BED CONTINUOUS BACKWASH
CELL SIZE (EACH)	SQ FT	200
HYDRAULIC LOADING		
ALL CELLS IN SERVICE	GPM/SQ FT	3.5
1 CELL OUT OF SERVICE	GPM/SQ FT	4.2
MEDIA TYPE	—	SAND
EFFECTIVE SIZE	MM	1.25
UNIFORMITY COEF.		1.5
DEPTH	IN	40

TERTIARY TREATMENT FACILITIES (CONT'D)

DESCRIPTION	UNITS	VALUE
CHLORINE CONTACT TANKS		
NUMBER OF TANKS		1
CHANNELS PER TANK	NO.	5
LENGTH OF CHANNEL	FT	110
CHANNEL WIDTH	FT	11
CHANNEL DEPTH	FT	11
LENGTH TO WIDTH (DEPTH)	RATIO	50:1
DETENTION TIME	HR	2
TERTIARY EFFLUENT PUMP STATION		
UTILITY WATER PUMPS		
NUMBER	—	3
TYPE	—	VERTICAL TURBINE
CAPACITY (EACH)	GPM	1 AT 300, 1 AT 600
EFFLUENT PUMPS		
NUMBER	—	3
TYPE	—	VERTICAL TURBINE
DRIVE CONFIGURATION	—	VARIABLE SPEED
CAPACITY (EACH OPERATED SIMULTANEOUSLY)	GPM	1750

SOLIDS PROCESSING SYSTEMS

DESCRIPTION	UNITS	VALUE
BELT FILTER PRESSES		
NUMBER	—	2
CAPACITY (EACH)	GPM	300
	LB/HR	1200
SIZE	METER	2

CHEMICAL HANDLING FACILITIES

DESCRIPTION	UNITS	VALUE
CHLORINATORS		
NUMBER	—	5
CAPACITY (EACH)	LB/DAY	1 AT 1000 4 AT 3000
SULFONATORS		
NUMBER	—	2
CAPACITY	LB/DAY	2800
ALUM PUMPS		
NUMBER	—	3
CAPACITY	GAL/HR	30
POLYMER FEEDERS		
NUMBER	—	2
CAPACITY (EMULSION)	GAL/HR	4.5
CAPACITY (SOLUTION)	GAL/HR	30
STORAGE		
LIQUID CHLORINE	NO. TANKS	2
	DAYS	100
	TONS	6
SULFUR DIOXIDE	NO. TANKS	2
	DAYS	150
	TONS	60
ALUM	NO. TANKS	1
	DAYS	60
	GAL	18,000
SOLUTION POLYMER	NO. TANKS	1
	DAYS	60
	GAL	6,000
EMULSION POLYMER (IN ADDITION TO DRUM STORAGE)	NO. TANKS	1
	DAYS	10
	GAL	150

/usr/cl ater/prj/pas/draft/a1_14.dgn jcd
14-FEL 12 08:40

WARNING
0 ½ 1
IF THIS BAR DOES NOT MEASURE 1 THEN DRAWING IS NOT TO SCALE.

SCALE — HORIZONTAL NO SCALE; VERTICAL NO SCALE

CLEAN WATER PROGRAM
for Greater San Diego

DRAWING STATUS

NO.	DATE	REQ.	REVISION DESCRIPTION	DRAWN	CKD	APD	PE	EM	DA/OC

DRAWING NO.
SHEET NO.
CIP NO.
SPECIFICATION NO.

EXAMPLE DESIGN CRITERIA SHEET
FIGURE A1-14

CITY OF SAN DIEGO, CALIFORNIA
SHEET OF SHEETS

WATER W.O.
SEWER W.O.

CIP DIRECTOR — DATE — DEPUTY DIRECTOR

DESCRIPTION	BY	APPROVED	DATE	FILMED

DESIGN ENGINEER
CONTROL CERTIFICATION
LAMBERT COORDINATES
-D

CONTRACTOR — DATE STARTED
INSPECTOR — DATE COMPLETED

CIVIL DRAWINGS

Civil drawings are classified as follows:

Site Plan

Guidelines were discussed earlier in this section.

Horizontal Control and Paving Plans

Each sheet may have a key index at the lower right corner with hatching to indicate the plan location on the site. The following should be shown on these drawings:

- The grid system with the grid reference at the perimeter.
- All existing structures/improvements with easy-to-identify join lines at the interface. New improvements should be shown solid to stand apart from the existing which are to be shown dashed or screened.
- Coordinates of structures, roads and all surface features. Two coordinates are necessary to locate each structure.
- The various types of paving clearly distinguishable to separate one from the other.
- Centerlines of point intersection (PI), curve data, road dimensions, etc., in sufficient quantity to locate all improvements without the need for calculations.
- Cross referencing of sections and details associated with the paving.
- Catch basins, manhole, and other utility structures.
- Parking and striping with dimensions or coordinates.

Refer to Figure A1-15 for an example.

Grading and Drainage Plans

Each drawing may have a key index at the lower right corner with hatching to indicate the plan location on the site. The following should appear on these drawings:

- The grid system with the grid reference at the perimeter.
- Existing structures, contours and elevations shown screened or dashed.
- The new contour lines and elevations of the new improvements shown solid to stand out and be legible.
- Control points needed in addition to those of structures and pavement, shown with dimensions or coordinates.
- Flow lines and ridges.

- Labeled transitions.
- Cross referencing to sections or details associated with the grading.

Figure A1-16 is an example of a grading plan.

Yard Piping Plans

Each drawing may have a key index in the lower right corner with hatching to indicate the plan location on the site. The following appear on these drawings:

- The grid system with the grid reference at the perimeter
- Existing piping and structures dashed or screened
- New improvements with solid lines
- New piping showing coordinates, size, material and fluid to be conveyed
- Cross referencing to profiles, sections and details associated with yard piping
- Any temporary piping needed to maintain plant operations during construction
- Any work by others which affects the yard piping
- Invert elevations on gravity lines six-inches and smaller which do not have a profile

Figure A1-17 is an example.

Section Drawings

Section drawings include the following:

- Screened horizontal and vertical guide lines at 100-feet and 10-foot intervals, respectively
- Existing ground lines and structures
- New grade lines and structures
- Depth of existing soil removal and reworking (to provide structural fill for new improvements)
- Extent and thickness of special materials such as select fill and gravel

N 10100 | N 10000 | N 9900 | N 9800 | N 9700 | N 9600

MATCH LINE, SEE SHEET 1-C-1

JOIN EXISTING CURB & GUTTER

P.C. N 10037.88 E 9720.91

EXISTING PRIMARY CLARIFIERS

EXISTING PAVEMENT

A C-58 ASPHALT PAVEMENT

E 9700

END SIDEWALK BEGIN C & G N 10037.88 E 9662.72

N.E. CORNER FILTER N 10037.88 E 9651.22

METER VAULT SEE SHT. 2S-4

36' R

25' R

25' R

21.5' R

N 9725.00 E 9658.50

MATCH LINE, SEE SHEET 5-C-1

FILTER

N.W CORNER FILTER N 10037.88 E 9616.76

A C-58

4'

E 9600

INFLUENT PUMP STATION

CONC. CURB B C-59

C SIDEWALK C-58

N 9895.50 E 9581.81 S.E. CORNER TURN-AROUND

N 9895.50 E 9559.13 P.T.

EXISTING PAVEMENT

N.E. CORNER WALL N 10073.15 E 9573.43

N.E. CORNER MCC N 10073.15 E 9561.58

MATCH EXISTING PAVEMENT ELEVATION

A C-59

A 14S-1 RETAINING WALL WITH HANDRAIL

MCC BLDG.

B C-59

C C-61

B C-59

N.W. CORNER MCC N 10073.15 E 9523.21

N.W. CORNER PUMP STATION N 9983.35 E 9535.18

11' R

35' R

N 9860.50 E 9521.13 P.C.

LPG TANK

E 9500

N.W. CORNER WALL N 10073.15 E 9506.13

10'

CONCRETE CURB B C-59

A C-58

CONC. CURB & GUTTER A C-59

35' R

N 9770.00 E 9471.13

N 9725.00 E 9471.13

N 9700

N 9600

MATCH LINE, SEE SHEET 7-C-1

N 10100 | N 10000 | N 9900 | N 9800

1	2	3
4	5	6
7	8	9

DRAWING NO.

SHEET NO.

CIP NO.

SPECIFICATION NO.

EXAMPLE HORIZONTAL CONTROL AND PAVING SHEET FIGURE A1-15

CITY OF SAN DIEGO, CALIFORNIA
SHEET OF SHEETS

WATER W.O.
SEWER W.O.

CWP DIRECTOR DATE

DEPUTY DIRECTOR

DESIGN ENGINEER

CONTROL CERTIFICATION

LAMBERT COORDINATES -D

CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

DESCRIPTION	BY	APPROVED	DATE	FILMED

WARNING
0 ½ 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

SCALE HORIZONTAL 1"=40'
VERTICAL 1"=40'

CLEAN WATER PROGRAM for Greater San Diego

DRAWING STATUS

NO.	DATE	REQ.	REVISION DESCRIPTION	DRAWN	CKD	APD	PE	EM	DA/OC

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14-FL 92 08:42

MATCH LINE SEE DWG 00-CG-04

MATCH LINE SEE DWG 00-CG-06

MATCH LINE SEE DWG 00-CG-02

1.49 %
2.85 %
2.34 %
2.36 %
4.40 %
3.21 %
1.30 %
0.9%
10.0 %
2.63 %
5.12 %
2.24 %
2.24 %
4.5%
5.5%
2.30 %
3.09 %
4.32 %
2.96 %
3.20 %

28+00
27+00
26+00
25+00
6+00
5+00
4+00
3+00
2+00
1+00
8+00
9+00
10+00
11+00

54.25 HPT
54.11 LPT
GB
GB
54.5 FL
56.5 FL
60.5 FL
67.0 FL
62.5
62.8
62.6
63.1
61.2
61.2
61.7
58.2
50.0 FL
53.4 FL
55.7 FL
59.49
2309
CATCH BASIN
INSIDE WALL
2308
59.44
3094
55.98
CATCH BASIN
3095
36.05

1 ½:1 SLOPE
1 ½:1 SLOPE
1 ½:1 SLOPE
1 ½:1 SLOPE
1 ½:1 SLOPE
2:1 SLOPE
2:1 SLOPE
2:1
5:1

3035 EL 37.5
3034 EL 37.5
3033 EL 37.5
3032 EL 37.5
FG EL 37.5
3031 EL 37.5
LIMIT OF PAD EXCAVATION
3030 EL 37.5
3029 EL 41.0
FG EL 41.0
3028 EL 41.0
3027 EL 41.0
3026 EL 41.0
3025 EL 41.7
3024 EL 41.7
LIMIT OF PAD EXCAVATION
3023 EL 43.0
3022 EL 43.0
3021 EL 41.5
FG EL 41.5
3020 EL 41.5
LIMIT OF PAD EXCAVATION

B-5

4B 00-CX-01 BROW DITCH
6 00-CX-03
3 00-CX-01 BROW DITCH
ALLUVIAL REMOVAL 7 00-CX-01
4 00-CX-02
BROW DITCH 4A 00-CX-01

E 6309400
N 1778400
N 1778400
E 6310000

70'

OBSCURED
OBSCURED

NOTES

1. FOR DRAINAGE IMPROVEMENTS SEE DWG 00-CD-01
2. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF ALL GRADED ROADWAYS
3. FOR HORIZONTAL CONTROL SEE DWG 00-CH-03 AERIAL TOPOGRAPHY FLOWN ON 1-18-95
4. NOTE: PORTIONS OF ABOVE TOPOGRAPHY HAS BEEN OBTAINED FROM IMPROVEMENT PLANS FOR IBWC PLANT
5. SEE DRAWING 00-CG-11 FOR DATA POINT COORDINATES AND ELEVATIONS
6. CONTRACTOR SHALL REMOVE AND DISPOSE OF THE EXISTING 3-INCH STEEL/PLASTIC PRIVATE WATER LINE AS SHOWN ON DRAWING 00-C-01.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR TEMPORARY DIVERSION OF FLOWS FROM THE CANYON DEL SOL DRAINAGE TO PREVENT DAMAGE TO ONGOING OR COMPLETED WORK. CANYON DEL SOL DRAINAGE FLOWS SHALL EXIT THE SITE ONLY THROUGH THE EXISTING THREE 54-INCH CULVERTS AT THE SDR JUNCTION STRUCTURE.

0' 20' 40' 60' 80'

AREA G
AREA E
AREA H
AREA F
AREA D
AREA C
AREA B
AREA A

DRAWING NO.
SHEET NO.
CIP NO.
SPECIFICATION NO.

EXAMPLE GRADING PLAN FIGURE A1–16

CITY OF SAN DIEGO, CALIFORNIA
SHEET OF SHEETS

WATER W.O.
SEWER W.O.

PROJECT MANAGER DATE
DESIGN ENGINEER
CONTROL CERTIFICATION
LAMBERT COORDINATES

DESCRIPTION	BY	APPROVED	DATE	FILMED

CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

-D

WARNING
0 ½ 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

SCALE HORIZONTAL 1"=20'-0"
VERTICAL

METROPOLITAN WASTEWATER DEPARTMENT
City of San Diego

DRAWING STATUS

NO.	DATE	REQ.	REVISION DESCRIPTION	DRAWN	CKD	APD	PE	EM	QA/QC
1	6/02								

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N 8296.00
E 10412.00

N 8302.00
E 10400.00

12-PW-(8)

54-SE-(8)
SEE PROFILE NO. 12
SHEET C-48 & C-49

12-PW-(8)

FUTURE EQUALIZATION BASIN

FUTURE EQUALIZATION BASIN

E 10300
N 8800

E 10300
N 8400

MATCH LINE, SEE SHEET 2-C-1

2-UW-(16)

36-FE-(8)
SEE PROFILE NO. 19
SHEET C-53 & C-54

2-UW-(16)

NOTE 4
SHT. C-34
(TYP)

8-UW-(16)

2-UW-(6)

54-SE-(8)
SEE PROFILE NO. 12
SHEET C-48

54" TEE WITH
BLIND FLANGE

ROAD "A"

N 8302.00
E 10157.50

N 9351.50
E 10151.50

N 8310.00
E 10130.00

MATCH LINE, SEE SHEET 6-C-1

1	2	3
4	5	6

DRAWING NO.

SHEET NO.

CIP NO.

SPECIFICATION NO.

EXAMPLE
YARD PIPING PLAN
FIGURE A1-17

CITY OF SAN DIEGO, CALIFORNIA
SHEET OF SHEETS

WATER W.O.
SEWER W.O.

CMP DIRECTOR DATE

DESCRIPTION	BY	APPROVED	DATE	FILMED

CONTRACTOR DATE STARTED
INSPECTOR DATE COMPLETED

DEPUTY DIRECTOR
DESIGN ENGINEER
CONTROL CERTIFICATION
LAMBERT COORDINATES

-D

WARNING
0 1/2 1"
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

SCALE
HORIZONTAL 1"=40'
VERTICAL 1"=40'

CLEAN WATER PROGRAM
for Greater San Diego

DRAWING STATUS

NO.	DATE	REQ.	REVISION DESCRIPTION	DRAWN	CKD	APD	PE	EM	DA/OC

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STA 13+60.34 PI
BEGIN SDR
N 1,777,588.76
E 6,309,937.44
(2002)

STA 15+02.61 PI
N 1,777,453.75
E 6,309,889.90

STA 15+28.92 PT

STA 15+36.92 END SDR

STA 15+38.92
TYPE B-8 CO
WITH 36" DIA GRATE

G 1 D-10 SDSD STA 13+58.34 TYPE B-8 CO

STA 13+56.34
END SDR

14+00 115.96' S19° 23'55"W 15+00 16+00 17+00 459.08' S 54°39'38" W 18+00 19+00 189.09' S 54°39'38" W 21+00 22+00

STA 15+40.92
BEGIN SDR

5' X10'
CONC APRON
6" THICKNESS
L=8'
S 54°39'38"W
1 J

72-SDR-(26) TYP

50' 50'

100' CONSTRUCTION
EASEMENT-MONUMENT
RD TO LIMITS OF
CHANNEL GRADING

O 1 R=40.00'
DELTA=79°33'49"L
L=55.55'
T=33.30'
USE 4' LENGTH PIPES WITH
5° BEVELS AT ONE END

WALL ELEVATION 5 / 00-CD-11

EXST LOW
FLOW DEVICE

EXST CONC CHANNEL

STA 20+02.00 TYPE B-8 CO D-10 SDSD 1 M

STA 21+93.09
PC

EXST 1 TON
RIP RAP
CHANNEL

F 1

13+00 S00° 28'47"W 12+00

STA 14+76.30 PC

MONUMENT ROAD

1 H

R=85.50'
DELTA=35°15'44"R
L=52.62'
T=27.17
USE 8' LENGTH PIPES WITH
5° BEVEL AT ONE END

FOR BROW DITCH ELEVATIONS
SEE XDWG 00-CG-09

STA 20+00
END SDR

STA 20+04
BEGIN SDR

N 1 ALTERNATE 4' RCP STRAIGHT PIPE
SECTIONS AND 2' RCP VELOCITY
CONTROL RINGS FROM STATION
20+04 TO 21+93 (VELOCITY
CONTROL RINGS ON 6' CENTERS)
HEIGHT OF RINGS = 6"

STA 22+20.86 PI
N 1,777,034.60
E 6,309,298.77
(2004)

EXST 16" PVC SS

STA 22+48.63 PT, PCE
& HWL
N 1777004.29
E 6309312.80

FOR LIMITS OF HWL,
RIP RAP & GRADING
SEE DWG 00-CG-10

STA 11+50
SEE DWG 00-CD-09

MATCH LINE

EXST 16" PVC SS

EXST RIP RAP CHANNEL

P 1 D90 CT- HEADWALL TYPE B

HGL EL-132.00

HGL EL 124.09

HGL EL -125.42

HGL EL -115.47

EXST 16" PVC SS
(77.84 INVT)
CONTRACTOR TO
VERIFY

EXST 16" PVC SS
(105.63 INVT)
CONTRACTOR TO VERIFY

M 1 RIM EL 98.10

RIM EL 78.00 G 1

TG EL 84.00 K 1

HGL EL-64.65
HGL EL-64.62

HGL EL-66.73

14+76.30
HGL EL-66.92

15+28.92
HGL EL
-68.53

HGL EL-68.48

OG

HGL

L=459.08FT
2.00%

L=176.58FT
1.98%

L=244.63FT
18.56%

2.01%

POINT

SAME

HGL EL-77.58
HGL EL-79.35

STA 11+50 MATCH LINE
SEE DWG 00-CD-09

STA 13+56.34
60.40 INVT

STA 13+60.34
60.90 INVT

STA 15+36.92
64.40 INVT

STA 15+40.92
64.90 INVT

STA 20+00.00
74.10 INVT

STA 20+04.00
74.60 INVT

STA 22+48.63
120.00 INVT
END SDR

72-SDR-(26) 1 F

J I H 1 72-SDR-(26)
SEE PLAN
FOR LIMITS

72-SDR-(26) 1 L

O 1 72-SDR-(26) SEE PLANS FOR LIMITS

72-SDR-(26) 1 N

11+50 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00 23+00

FOR CONSTRUCTION NOTES REFER TO DWGS 00-CD-01 & 00-CD-09

DRAWING NO.	
SHEET NO.	
CIP NO.	
SPECIFICATION NO	

EXAMPLE
PLAN AND PROFILE SHEET
FIGURE A1-18

CITY OF SAN DIEGO, CALIFORNIA
SHEET OF SHEETS

WATER W.O.
SEWER W.O.

PROJECT MANAGER DATE

DESCRIPTION	BY	APPROVED	DATE	FILMED

DESIGN ENGINEER

CONTROL CERTIFICATION

LAMBERT COORDINATES

CONTRACTOR KEWIT PACIFIC DATE STARTED 01/12/98
INSPECTOR DON SHARP DATE COMPLETED 10/01/98

-D

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

SCALE
HORIZONTAL 1"=40'
VERTICAL 1"=10'

METROPOLITAN WASTEWATER DEPARTMENT
City of San Diego

DRAWING STATUS

NO.	DATE	REQ.	REVISION DESCRIPTION	DRAWN	CKD	APD	PE	EM	QA/QC
1	6/02		AS-BUILT						

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- Subsurface drains (if required)
- Space limitations and other unusual constraints

Profile Drawings

Profile drawings include the following:

- A profile number for each profile
- Existing ground lines
- New grade lines
- New pipe invert and soffit and appurtenances such as meters, manholes, coupling, valves, etc
- Stations along horizontal distances to all pipe angle points, pipe appurtenances, inlets, outlets, and any other items necessary for fabrication and installation
- All pipe crossings
- All slopes
- Bedding conditions and pipe class or strength
- For storm drain, Q and hydraulic grade for each reach
- Concrete encasements where needed
- Casing where needed and casing data
- Special pipe supports where needed

Detail Drawings

These drawings are used as needed to clearly show the design details.

Demolition Plans

These drawings may have a key index at the lower right hand corner with hatching to indicate the plan location on the site. Demolition drawings show the following:

- The grid system with the grid reference at the perimeter
- Existing conditions
- Items requiring removal with circled numbers keyed to the notes
- Large areas or structures requiring removal with hatched lines for ease of identification
- Items to be protected with squared numbers keyed to the notes
- Off-Site Plan and Profile Drawings

Off-Site Plan and Profile Drawings

These drawings apply to pipelines within the public right-of-way and outside a treatment plant site. Plan and Profile sheets should adhere to the following guidelines:

1. The drawings should consist of two parts, the top part, a profile; and the bottom part, a construction plan with the pipe line superimposed on it.

2. The vertical and horizontal reference lines for the profile should be selected to minimize distortions and maximize clarity. Reference lines should be screened or of light weight so as not to interfere with the information to be communicated.

3. The profile must show the existing ground line over the pipe line, a finished grade if the grade is to change, the invert of the pipe, the soffit of the pipe, all lines crossing the new pipe line and special conditions such as concrete encasement or steel casing for boring.

4. In addition, the profile shows manholes, cleanouts and other appurtenant items. Also, the class of pipe, class of bedding and the length of the pipe between manholes are shown.

5. Station lines must be shown at manholes, grade breaks and horizontal bends with invert elevations and slopes between them.

6. The plan must show existing contours, existing improvements dashed or screened so as to stand apart from the new improvements which are solid lines. Plans should show stations for the manholes, angle points and other appurtenances to correspond with the profile stationing.

7. The plan must show permanent easements and temporary construction easements which are required.

8. The plan must show referencing to details shown on other sheets or on the same sheet where room allows.

9. In addition to stationing, the plan must show coordinates to allow location from survey monuments.

10. The plan should also show special conditions to alert the contractor for construction requirements, which may be out of the ordinary.

Figure A1-18 is an example Plan and Profile Sheet.

LANDSCAPING/IRRIGATION

The consultant should use the symbology from the City of San Diego and Regional Standard Drawings.

ARCHITECTURAL DRAWINGS

Architectural drawings are classified as follows:

Floor Plans

Floor plan drawings show key plan, exterior overall dimensions, door and window opening dimensions and symbols, louver opening dimensions and symbols, interior partition dimensions and thickness, room titles, interior elevations, stairs, cabinet and counter layouts, depressed slab areas, duct shafts, pipe spaces, fire hose and extinguisher cabinets, soundproof and fire rated partitions, skylights, seismic separation joints (interior and exterior), and movable partitions.

Exterior Elevations

These drawings show datum, floor lines, dimensions and elevations, openings (windows, doors, entrances and louvers), parapets (solid and piperail), copings and gravel stops, leaders and heads, seismic separation joints, wall material and finish.

Roof Plans

These drawings show canopies, overhangs, parapets, railings and curbs, copings, seismic joints, skylights, roof ventilators, flashing, roofing, high and low points, crickets and valleys, drains, overflow scuppers, gutters, leaders and heads, and splash blocks.

Cross Sections - Longitudinal and Transverse

These drawings show datum, floor lines, dimensions and elevations, framing (floor, beams, exterior wall, roof), ceilings, and room partitions.

Interior Elevation Drawings

These drawings show ceiling heights, building material designation, and special equipment.

Reflected Ceiling Plans

These drawings show lighting, ceiling pattern, T-bar grids, HVAC diffuser locations, ceiling access, skylights, and soffits.

STRUCTURAL DRAWINGS

Structural drawings are classified as follows:

Foundation and Floor Plans

These drawings show the basin or building foundation and first floor plan. The following guidelines apply to these drawings:

- All dimensions required by the contractor to build the structures must be shown. This includes clearance between walls, thicknesses of all members, slopes, locations of floor drains and elevations. Structural plans should show two coordinates to identify locations.

- When architectural drawings are provided, door, window and louver openings should be shown; however, locations need not be given on structural drawings if shown on architectural drawings.

- All construction, contraction and expansion joints must be shown and located on the plan. These joints should be referenced to the typical standard details showing the different types of joints.

Top and Walkway Plans

The following should be shown on these drawings:

- All openings on the deck, covers, ladders and railings must be shown and located on the plan.
- All construction, contraction and expansion joints must be shown, located and referenced to the appropriate standard details.

Roof Framing Plans

The following are guidelines for these drawings:

- All framing members must be shown and dimensioned clearly on the roof plan. Size and spacing must be shown.
- All construction and expansion joints must be shown, located and referenced to the appropriate standard details.
- Roof openings, equipment supports, framing around openings, railings, and roof slopes must be shown and located on plans.

Cross Sections and Details

The following guidelines apply to these drawings:

- It is critical that all cross sections required to enable the contractor to understand and build the structure be shown. These drawings show elevations of all slabs and levels, clearance between walls, openings, pipes through walls, thickness and size of all members, and construction and expansion joints.

- Partial sections and details show areas that require special attention.

- Rebar sizes and spacing, lap locations, termination points and special reinforcement should be shown on all reinforced concrete and masonry structure sections.

- Size and spacing of all wood or steel framing members should appear.

- Connection details should include member size, weld type and size, bolt diameter and numbers, and anchor bolt size and embeddment depth.

General

The following items need to be addressed on the structural drawings:

Stairways: All stairways (concrete, steel, aluminum, etc.) must be detailed except when Architectural Drawings detail the stairways. Details must include number and size of treads between landings, size of stringers, beams, and column required.

Grating: A general grating detail must be included in the structural standard details. Grating type, depth and any additional supports required must be shown on the appropriate drawing.

Stop Gates: Aluminum and fiberglass hand operated stop gates must be shown on the appropriate drawing. The gate number, size and thickness must be given.

Handrailings: Railings, guardrails and handrailings should be shown. Notes should call out the material and type required.
Access Hatches: Size, material and type (single or double leaf) of all access hatches should be shown. If special hatches are required, detail them also.

Finished Grades: In all structural sections finished grade lines must be shown where they occur. Unlabeled approximate elevations are appropriate.

Ladders: Ladders should be shown with notes for the required material.

References: Every standard structural detail used on the project must have a reference somewhere on the structural drawings.

MECHANICAL DRAWINGS

Mechanical drawings are classified as follows:

Area Drawings

Area drawings show all the equipment both inside and outside the plant structures. Area drawings also show the routing and location of piping systems to ensure clearances between all components. Develop area drawings using the following guidelines:

1. System component identification will be in accordance with Subsection A1.18 of this manual. Piping callouts will include size, fluid, and piping material.

2. All process piping must be shown.

3. Existing piping and future piping and equipment shown on the drawing should be illustrated according to the line patterns on Figure A1-3.

4. Insulation is shown on short sections and the class noted within the insulation outline.

5. Valve or in-line components must be symbolized to scale. Motor and air actuators will be outlined to show clearances and orientation. Figure A1-19 is an example of a portion of an Area Drawing.

6. Terminal dimensions will not be shown at the connection of piping to vendor furnished equipment.
7. Pipe supports and instrumentation taps are shown and identified but not dimensioned.

8. High and low point vents and drains should be noted if no system isometric is provided.

9. A key plan may be placed at the lower right hand corner of each drawing to indicate how the plant is divided into areas and by cross-hatching shows the particular area that the drawing covers. Each drawing adjoining another area will have a match line and the number of the adjacent drawing. Any piping continuing from one area to another will be identified at this line.

10. Plan views must be drawn for each main floor level. When required, partial plans may be used. One longitudinal and one transverse section along with additional partial sections are generally all that are required.

11. In addition, the following should be shown on area drawings:

    - Column centerlines, outlines and designations
    - General outlines of building exterior walls
    - Doors, hatchways, elevators, stairs, platforms, and ladders
    - Piping and ductwork
    - Centerlines of rails and outline of cranes and monorails necessary to show clearances and hook limits
    - Outlines of all equipment in adequate detail to indicate clearance and space requirements

Utility Drawings

Utility drawings (HVAC, Plumbing, and Fire Protection) can be drawn on screened area drawings.

Isometric Drawings

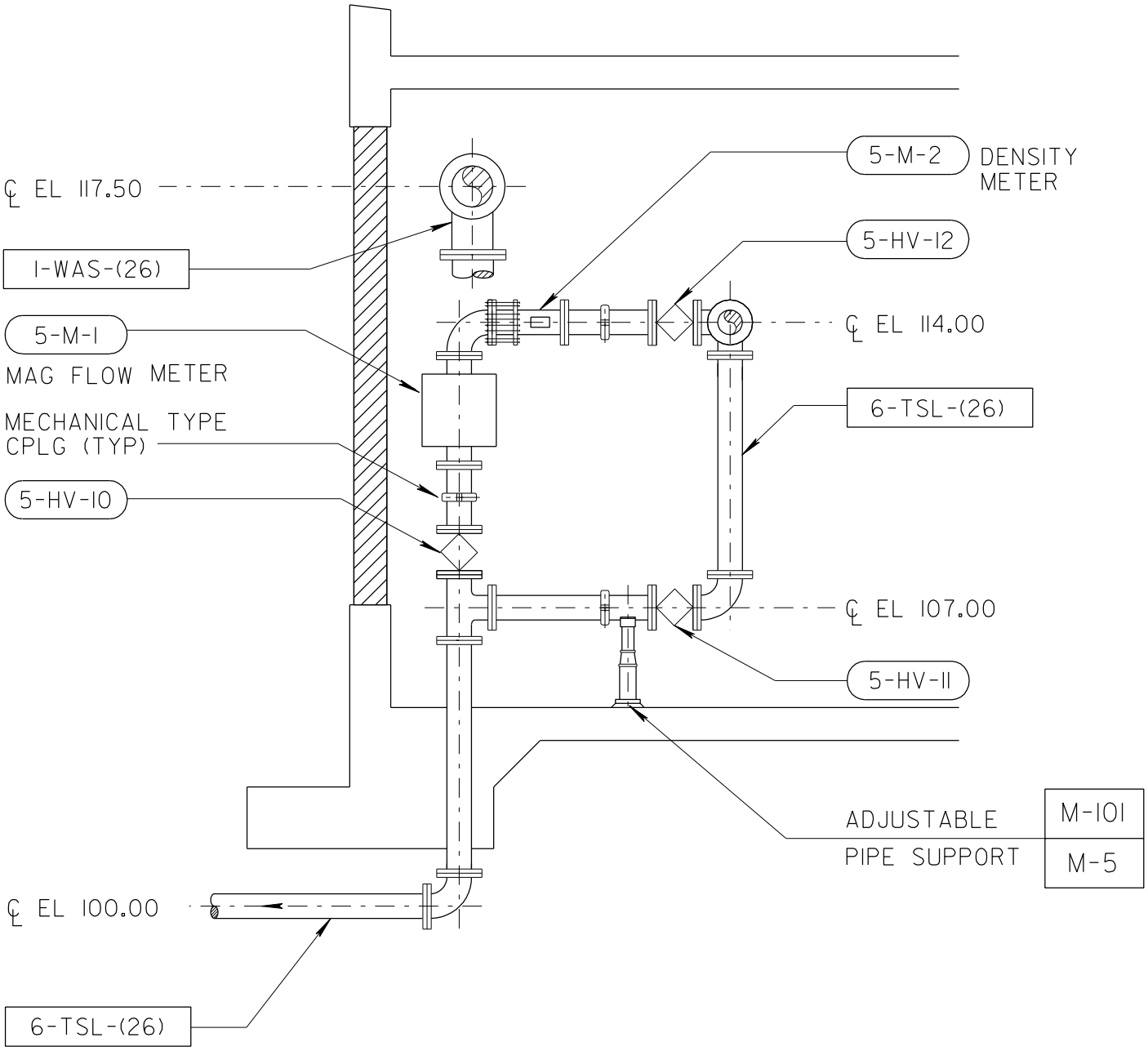
Isometric drawings provide clarity to piping layouts. They are helpful when a pipe stress analysis is required.

System Flow Diagrams

System flow diagrams are schematic drawings which show operational relationships between various components and define the design variables for the major modes of operation.

Equipment Schedule

The equipment schedule shows all the major equipment categorized using the abbreviations shown in Table A1-6.



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11/22/2005

EXAMPLE OF MECHANICAL DRAWING WITH CALL OUTS

FIGURE A1–19

Piping Schedule

The piping schedule includes the following information regarding piping and fittings:

- Materials
- Pressure ratings
- Types of Joints
- Fittings
- Testing requirements

The standard layout for the piping schedule is Standard Drawing M-1 in Volume IV, Section A3.

Standard Details

Each discipline should arrange its standard details on drawings similar to Figure A1-20 which is an example of how the Mechanical discipline sheet should look.

ELECTRICAL DRAWINGS

Electrical drawings are classified as follows:

Site/Plot Plan

These drawings incorporate the following:

1. Arrangement of structures and roadways

2. Underground distribution system including location of pullboxes, manholes, ducts

3. Location of switchgear, motor control centers, power panels, main control board, and major local control panels

4. Street lighting

5. Area/parking lighting. Note that street and area/parking lighting plans are to be drawn on separate sheets to avoid confusion with power and control plans.

6. Location of power service, utility substation and in-plant substations

7. Key plan and orientation arrow

8. Drawing references for each structure

Power Block Diagram

This drawing is required for large and complex projects, and must present the following:

- Interconnections of major electrical equipment such as revenue metering section, main circuit breaker or main disconnect switch, switching centers, substations and distribution transformers, motor control centers, emergency generators and power panels
- Identification of all major electrical equipment
- Identification of all power cables and conduits
- Sizes of all major electrical components and loads

Single Line Diagrams

These drawings show distribution of power to 4160V and 480V loads. These drawings incorporate the following:

1. Power service and revenue meter connections

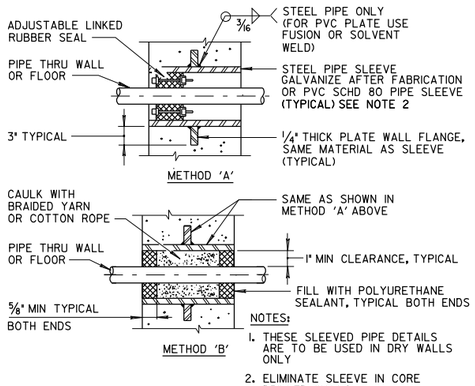
2. Main circuit breakers or fused disconnect switches for the main power entrance, power distribution, and motor control centers

3. Motor loads complete with corresponding horsepower sizes, branch circuit breaker or fused disconnect switches, motor starters, branch circuit conductors, miscellaneous devices and components such as local disconnecting means, speed controllers, power factor correcting capacitors, etc.

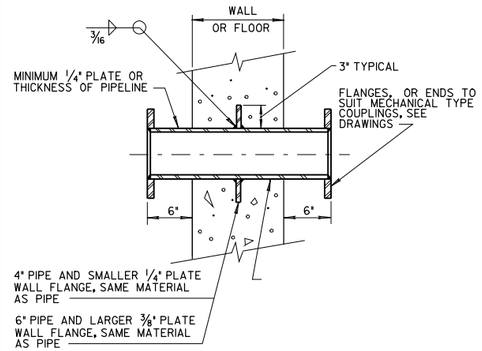
4. Miscellaneous electrical loads complete with corresponding circuit breakers, starters, contactors, disconnects, etc.

5. Single line diagrams for panel or motor control centers must show:

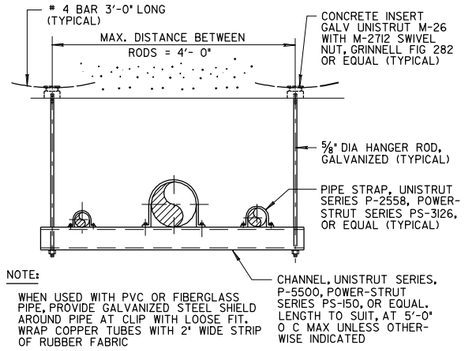
    - Total Connected Loads including existing, proposed and future loads.
    - Approximate Maximum Demand



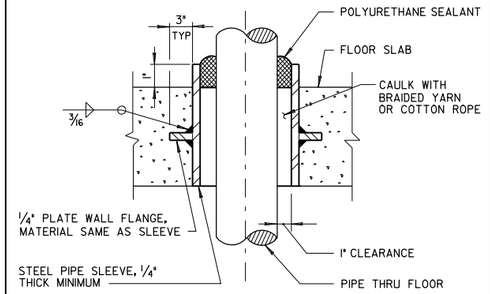
SLEEVED PIPE OPENING — M-104 CWP



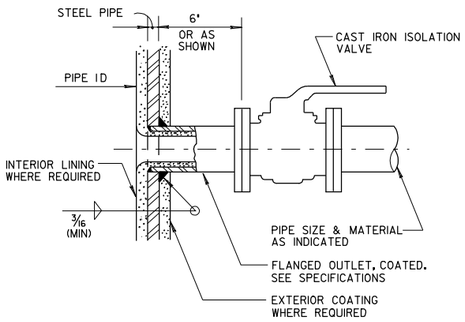
FABRICATED PIPE THIMBLE — M-106 CWP



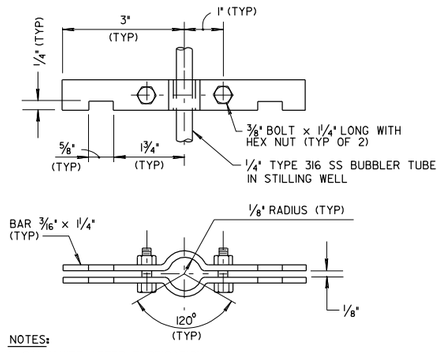
TRAPEZE PIPE HANGER — M-108 CWP



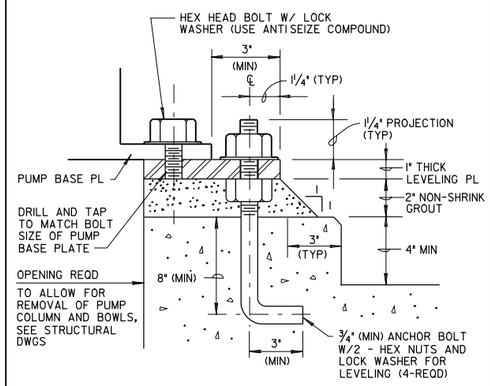
FLOOR PIPE SLEEVE — M-111 CWP



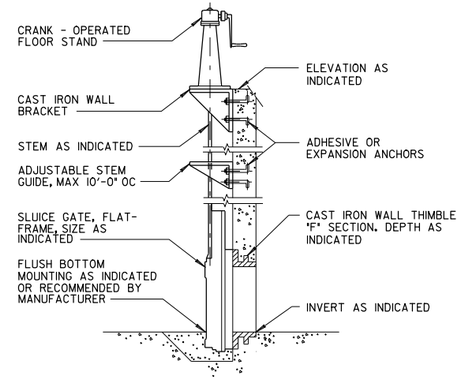
PIPE LINE CONNECTION 4" AND LARGER — M-112 CWP



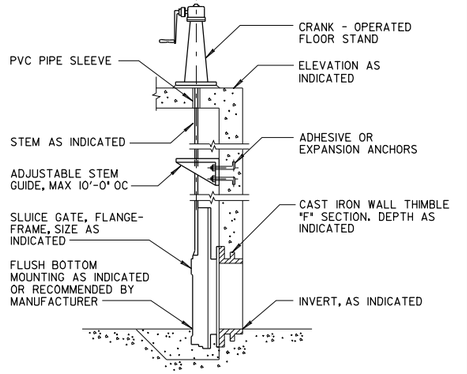
POSITIONING CLAMP — M-113 CWP



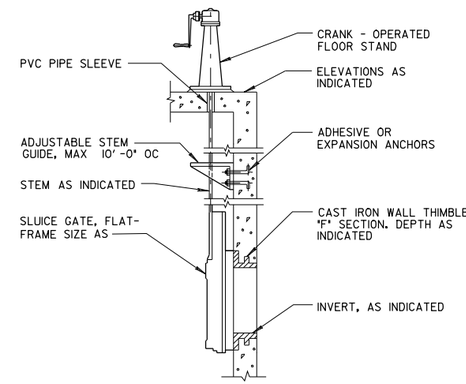
VERTICAL PUMP MOUNTING BASE — M-114 CWP



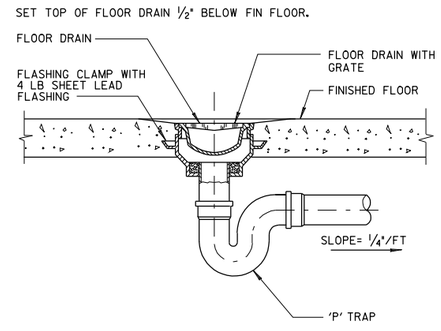
SLUICE GATE — M-201 CWP



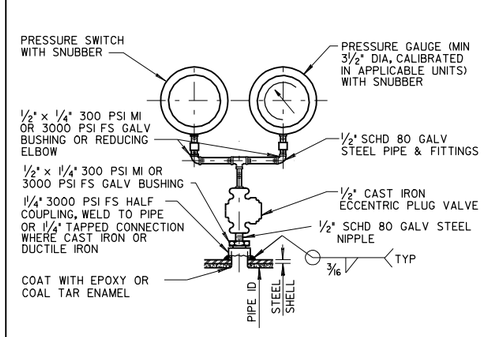
SLUICE GATE — M-202 CWP



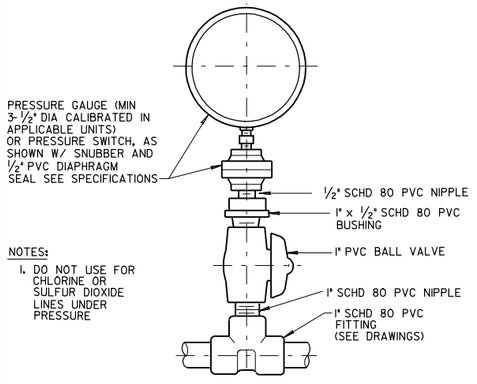
SLUICE GATE — M-203 CWP



FLOOR DRAIN — M-302 CWP



PRESSURE GAUGE AND PRESSURE SWITCH — M-602 CWP



PRESSURE GAUGE OR PRESSURE SWITCH WITH PVC DIAPHRAGM SEAL — M-603 CWP

DRAWING NO.

SHEET NO.

CIP NO.

SPECIFICATION NO.

FOR THE CITY OF SAN DIEGO
METROPOLITAN WASTEWATER DEPARTMENT

MWWD DIRECTOR _____ DATE _____

EXAMPLE MECHANICAL STANDARD DETAILS FIGURE AI-20

CITY OF SAN DIEGO, CALIFORNIA
SHEET OF SHEETS

WATER W.O. _____
SEWER W.O. _____

PROJECT MANAGER _____ DATE _____

DESCRIPTION	BY	APPROVED	DATE	FILMED

DESIGN ENGINEER _____

CONTROL CERTIFICATION _____

LAMBERT COORDINATES _____

CONTRACTOR _____ DATE STARTED _____
INSPECTOR _____ DATE COMPLETED _____

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

SCALE		
	HORIZONTAL	NO SCALE
	VERTICAL	NO SCALE

METROPOLITAN WASTEWATER DEPARTMENT
City of San Diego

DRAWING STATUS

NO.	DATE	REQ.	REVISION DESCRIPTION	DRAWN	CKD	APD	PE	EM	QA/QC

R:\aepkg\getstar\levelog\al_20.dgn
16-JAN-2007 15:45
cdh

- Future Additional Loads
- Bus Ampacities
- Bus Bracing
- Circuit Numbers

6. Identification of all panels, motor control centers, feeders, subfeeders, branch circuit conductors and all loads

7. Substation transformers complete with all protective equipment such as circuit breakers, disconnect switches, surge arresters, grounding resistors, protective relays, etc.

8. Electrical interlocks

9. All instrumentation

Schematic Diagrams

These diagrams show the following:

1. Control scheme for each electrical load

2. Interlocks between equipment controls

3. Locations of control components

4. Connections of electrical protective devices

5. Wire termination interphase points

6. Control power sources

7. Identification of all components

Electrical Equipment Elevations

These drawings incorporate the following:

1. Physical dimensions of electrical equipment enclosures

2. Arrangements of compartments

3. Preferred locations of buses

4. Individual compartment identifications and circuit numbers

5. Control panel arrangements

6. Empty compartments

7. Pull and transition sections

8. Types of enclosures

9. Miscellaneous features such as lights, receptacles, space heaters and exhaust fans inside enclosures

Power and Control Plans

These drawings show the following:

1. Physical locations of electrical loads

2. Identification of power and control conduit runs

3. Special routing of conduits

4. Signal conduit runs

5. Components such as disconnect switches, lockout-stop, manual switches, pressure switches, solenoids, level switches, temperature switches, miscellaneous instruments, special control devices, etc.

Lighting Plans

These drawings show the following:

1. Physical locations of all lighting fixtures

2. Locations and identification of lighting control switches

3. Power conduit homeruns

4. Fixture identifications and number

5. Location of lighting power panels

6. Lighting fixture circuit numbers

7. Mounting heights of fixtures

8. Special junction or splice boxes

Receptacle Plans

These drawings show:

1. Physical locations of all receptacles

2. Power conduit homeruns

3. Locations of receptacle power panels

4. Receptacle circuit numbers

5. Special types of receptacles

6. All other details necessary to convey the intent of the design to the electrical contractor

INSTRUMENTATION

Instrumentation drawings are classified as follows:

Process Control Diagrams

These diagrams describe the monitoring and control loops identified on the P&IDs discussed later.

Logic Diagrams

Logic diagrams must be developed for complex circuits in control panels to be provided by the instrumentation contractor.

Panel Layout Drawings

Panel layout drawings depict faceplate arrangement, legends, switch details and installation details. Semigraphics, when part of a panel, are normally detailed on a separate drawing.

Loop Interconnection Drawings

Loop Interconnection Drawings must be prepared for those projects where it is necessary to interface with existing control equipment. They will conform to ISA 5.4 expansion formats.

Instrument Installation Details

Instrument Installation Details show the installation of instruments in a diagrammatic fashion and list the quantity and quality of materials required.

Piping and Instrumentation Diagrams (P&ID)

P&IDs show major processes and related systems at the facility, including mechanical and electrical equipment, instrumentation, piping, valves, and control wiring in symbolic format. Although P&IDs are discussed only under Instrumentation Drawings to avoid duplication, they result from coordinated input from several disciplines.

Layout:

- Each drawing should feature only one system. Components of other systems can be shown if necessary for clarification but screening should be used to differentiate the secondary components from the primary system.

- The P&ID layout should be based purely on the schematic, not the facility layout. Processes should be arranged so that the main flow is from left to right and clockwise on the sheet.

- All process pipelines and valves are to be shown, regardless of type or size. Electrical, pneumatic, or other power supplies to instruments are not shown unless necessary for an understanding of the instrument. Instrument air valves are not shown.

- Sheets should be arranged to amply separate groups of equipment for showing interconnecting piping and valves and instrumentation.

Symbology:

- Symbols and abbreviations should be as discussed in Section A1.2.

- Symbols may be drawn with any orientation.

- Directional arrowheads must be used to clarify directions of flow and control signals. Gravity and 2-way flow must be noted. The direction of flow must be shown for 3-way valves where hookup depends on flow direction.

- The sequence in which the instruments are connected should be based on functional logic or information flow, not the signal connection sequence.

Equipment Identification:

- All valves and other electrical and mechanical equipment will be identified in accordance with Section A1-18. Titles and numbers must match all schedules. Pipelines must be identified by fluid and sequential numbers.

- Instrumentation will be identified by the functional identifiers and loop numbers discussed earlier. Instrument Society of America (ISA) standards should be followed for type, quantity, and location of instruments.

- Equipment identifiers are always oriented horizontally.

- If a given control loop has more than one instrument with the same function, a suffix should be appended to the loop number, such as FV-2A, FV-2B, FV-2C.

- The primary elements for a multipoint temperature recorder should be identified TE-25-1, TE-25-2, TE-25-3, etc.

- Equipment in subdivisions of loops should be assigned alternating suffix letter0s or numbers.

- An instrument which performs two or more functions is designated by all its functions. For example, flow recorder "FR 2" which has a pressure pen "PR 4" is designated "FR 2/PR 4." However, a common annunciator window for high and low temperature alarms is designated "TAHL 21" because distinctly different devices are not present.

Equipment Data:

- Equipment data will appear on the P&ID directly below the referenced equipment.

Line Conventions:

- Instrumentation signal lines may enter or leave an instrument symbol at any angle.

- Pipe segments of primary and secondary importance are differentiated by line weight.

- Pipe segments of equal importance which cross are broken according to the general rule that horizontal lines break and vertical lines do not. When pipe segments are not of equal importance, the lesser important one breaks at the crossing, regardless of direction.

- All dashed signal lines break whenever they cross other non-associated signal lines. Associated signal lines are joined by a solid dot.

APPENDIX A

SECTION A2

CADD GUIDELINES

A2.1 PURPOSE OF GUIDELINES

These guidelines provide instructions to the DESIGN CONSULTANT only on matters directly related to CADD. Section A1 - Drafting Standards, Appendix A, covers topics that apply to both manual and computer-aided drafting. It gives detailed information on actual deliverables, including the requirements for (1) advertisement drawings, (2) "as awarded" (advertisement drawings plus addenda), and (3) record drawings or as-built drawings. It also controls the process of engineering changes so that addenda and change orders are properly tracked and clearly identified on drawings with revision clouds and other notations.

For legal purposes, the City requires that the primary deliverables for engineering drawings shall be sealed mylar plots. Also, delivery of the corresponding computer files for CADD drawings shall be required.

All CADD work shall be prepared using MicroStation CADD software. MicroStation is the City's CADD standard and no other CADD software shall be used.

CADD design files created during design and construction of the Metropolitan Wastewater facilities will be used by the City over the lifetime of those facilities. Therefore, the DESIGN CONSULTANT shall ensure that these design files enable the City to retrieve, use, and modify the CADD files during operation, maintenance, and modification of the facilities.

These guidelines provide the following quality characteristics for CADD files:

1. Well-organized transmittal and acceptance procedures

2. Uniformity in major aspects of CADD design, such as units of measurement, text font and size, and title block

3. Engineering discipline separation using reference files to overlay information for inter-discipline coordination

4. Data separation using level, color, and line weight within each design file to organize different types of elements

5. Full documentation of plotting procedures to make it possible for the City to generate output that exactly matches the mylar plots that are delivered by the DESIGN CONSULTANT

A2.2 COMPUTER FILES TO BE FURNISHED TO DESIGN CONSULTANT

Computer files developed during the pre-design effort will be made available to the DESIGN CONSULTANT by the Project Manager where applicable. It is anticipated that the following items will be made available to the DESIGN CONSULTANT:

1. Drawing Set Cover Sheet

2. Overall Site Plan Sheet

3. General and Project Notes Sheet

4. Standard Drawing Border with Title Block

5. Fluid Abbreviations Sheet

6. Standard Abbreviations Sheets

7. Standard Symbols Sheets

8. Piping Schedule

9. Traffic Control Plan

10. Plan and Profile Border

11. Seed Files (blank files) for 2D and 3D Design Files for Specific Applications

12. Aerial Survey Contour Maps used for Pre-Design

13. Files of regular point coordinates for digital terrain modeling, which were used to generate the Aerial Survey Contour Maps (item 12 above).

14. Pre-design Figures (included in Pre-design Report)

15. Standard Details for the civil, architectural, structural, mechanical, electrical, and instrumentation disciplines

A2.3 FILE MANAGEMENT AND DIRECTORY STRUCTURE

DIRECTORY STRUCTURE

The DESIGN CONSULTANT shall organize CADD files into meaningful groups by means of a hierarchical directory structure, according to engineering disciplines and file type.

ENGINEERING DISCIPLINE

Engineering discipline or sub-specialty level separation sheets given (Figures A2-1 through A2-20) show typical discipline divisions. DESIGN CONSULTANT shall use these divisions. Additional divisions for sub-specialties within disciplines are permitted.

DIRECTORY NAMES

The DESIGN CONSULTANT may use any reasonable directory names. The DESIGN CONSULTANT shall fully document each directory name with the CADD Directory Structure Log form (Figure A2-21).

FILE NAMES

File names shall include the drawing number as the last characters in the name preceding

DESIGN FILE LOG

CLEAN WATER PROGRAM
for Greater San Diego

File Name _____

Description CIVIL – GENERAL (DETAILS)

Directory _____

Project Name / No. _____

Project Engineer _____ Log Originator _____

LV	CO	WT	LC	Level Description	LV	CO	WT	LC	Level Description
1	V	V	V	CELLS	33				
2	V	V	V	LINE WORK	34				
3					35				
4					36				
5					37				
6	0	2	0	TEXT	38				
7					39				
8	0	0	0	AUTOMATIC DIMENSIONING	40				
9					41				
10					42				
11					43				
12					44				
13					45				
14					46				
15					47				
16					48				
17					49				
18					50				
19					51				
20					52				
21					53				
22					54				
23					55				
24					56				
25					57				
26					58				
27					59				
28					60				
29					61				
30					62	2	1	0	BORDER TEXT
31					63	3	2	0	REVISION, ADDENDA CLOUDS, TEXT
32									

DISCIPLINE LEVEL LOG : CIVIL – GENERAL (DETAILS)

FIGURE A2–1

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11/22/2005

DESIGN FILE LOG

CLEAN WATER PROGRAM
for Greater San Diego

File Name _____

Description INSTRUMENTATION

Directory _____

Project Name / No. _____

Project Engineer _____ Log Originator _____

LV	CO	WT	LC	Level Description	LV	CO	WT	LC	Level Description
1					33	10	2	0	PIPING
2	9	4	3	MODULE BREAKS	34	10	2	0	PIPING
3	9	4	7	PACKAGED SYSTEM BREAKS	35	10	2	0	PIPING
4	13	4	0	HOLDS	36	10	2	0	PIPING
5					37	10	2	0	PIPING
6					38	10	2	0	PIPING
7					39	10	2	0	PIPING
8					40	10	2	0	PIPING
9					41	10	2	0	PIPING
10					42	10	2	0	PIPING
11					43	10	2	0	PIPING
12				GUIDELINES	44	10	0	2	PIPING DUMB
13					45	12	2	0	INSTRUMENTS
14	11	0	2	DRAWING DUMB	46	12	2	0	INSTRUMENTS
15	8	2	0	EQUIPMENT	47	12	2	0	INSTRUMENTS
16	8	2	0	EQUIPMENT	48	12	2	0	INSTRUMENTS
17	8	2	0	EQUIPMENT	49	12	2	0	INSTRUMENTS
18	8	2	0	EQUIPMENT	50	12	2	0	INSTRUMENTS
19	8	2	0	EQUIPMENT	51	12	2	0	INSTRUMENTS
20	8	2	0	EQUIPMENT	52	12	2	0	INSTRUMENTS
21	8	2	0	EQUIPMENT	53	12	2	0	INSTRUMENTS
22	8	2	0	EQUIPMENT	54	12	2	0	INSTRUMENTS
23	8	2	0	EQUIPMENT	55	12	2	0	INSTRUMENTS
24	8	2	0	EQUIPMENT	56	12	2	0	INSTRUMENTS
25	8	2	0	EQUIPMENT	57	12	2	0	INSTRUMENTS
26	8	2	0	EQUIPMENT	58	12	2	0	INSTRUMENTS
27	8	2	0	EQUIPMENT	59	12	0	2	INSTRUMENTS DUMB
28	8	2	0	EQUIPMENT	60				
29	8	0	2	EQUIPMENT DUMB	61				
30	10	2	0	PIPING	62	2	1	0	BORDER TEXT
31	10	2	0	PIPING	63	3	2	0	REVISION, ADDENDA CLOUDS, TEXT
32	10	2	0	PIPING					

DISCIPLINE LEVEL LOG : INSTRUMENTATION

FIGURE A2–20

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DESIGN FILE LOG

CLEAN WATER PROGRAM
for Greater San Diego

File Name _____

Description ELECTRICAL

Directory _____

Project Name / No. _____

Project Engineer _____ Log Originator _____

LV	CO	WT	LC	Level Description	LV	CO	WT	LC	Level Description
1	2	3	0	ELECTRICAL EQUIPMENT	33				
2	2	8	0	GROUNDING	34				
3	6	5	0	EXPOSED CONDUIT	35				
4	6	6	3	UNDERGROUND CONDUIT	36				
5	4	2	0	LIGHTING	37				
6	0	2	0	TEXT	38				
7	0	0	0	AUTOMATIC DIMENSIONS	39				
8					40				
9					41				
10					42				
11					43				
12					44				
13					45				
14					46				
15					47				
16					48				
17					49				
18					50				
19					51				
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21					53				
22					54				
23					55				
24					56				
25					57				
26					58				
27					59				
28					60				
29					61				
30					62	2	1	0	BORDER TEXT
31					63	3	2	0	REVISIONS, ADDENDA CLOUDS, TEXT
32									

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11/22/2005

DISCIPLINE LEVEL LOG : ELECTRICAL

FIGURE A2–19

DESIGN FILE LOG

CLEAN WATER PROGRAM
for Greater San Diego

File Name _____

Description HVAC

Directory _____

Project Name / No. _____

Project Engineer _____ Log Originator _____

LV	CO	WT	LC	Level Description	LV	CO	WT	LC	Level Description
1	0	3	0	DOUBLE LINE DUCTWORK	33				
2	0	3	2	DOUBLE LINE DUCTWORK (DASHED)	34				
3	2	4	3	HVAC EQUIPMENT	35				
4	0	6	0	SINGLE LINE PIPE /FITTINGS	36				
5	0	0	4	DUCTWORK EQUIPMENT, C/L	37				
6	0	1	0	TEXT CALL–OUTS	38				
7	0	2	0	TEXT SUB–TITLES	39				
8	0	0	0	AUTOMATIC DIMENSIONING	40				
9	0	2	0	HANGERS, MISC EQUIPMENT	41				
10					42				
11					43				
12					44				
13					45				
14					46				
15					47				
16					48				
17					49				
18					50				
19					51				
20					52				
21					53				
22					54				
23					55				
24					56				
25					57				
26					58				
27					59				
28					60				
29					61				
30					62	2	1	0	BORDER TEXT
31					63	3	2	0	REVISION, ADDENDA CLOUDS, TEXT
32									

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DISCIPLINE LEVEL LOG : HVAC

FIGURE A2–18

DESIGN FILE LOG

CLEAN WATER PROGRAM
for Greater San Diego

File Name _____

Description MECHANICAL

Directory _____

Project Name / No. _____

Project Engineer _____ Log Originator _____

LV	CO	WT	LC	Level Description	LV	CO	WT	LC	Level Description
1	3	3	0	DOUBLE LINE PIPE,FITTINGS, VALVES	33				
2	3	3	2	DOUBLE LINE PIPE,FITTING S, VALVES	34				
3	4	6	0	SINGLE LINE PIPE,FITTINGS, VALVES	35				
4	4	6	2	SINGLE LINE PIPE,FITTINGS, VALVES	36				
5	5	3	0	MECHANICAL EQUIPMENT	37				
6	5	3	2	MECHANICAL EQUIPMENT	38				
7	0	1	0	STRUCTURES	39				
8	0	1	2	STRUCTURES	40				
9	0	1	0	PIPE SUPPORTS, MISC EQUIPMENT	41				
10	0	0	0	AUTOMATIC DIMENSIONING	42				
11	6	0	0	EQUIPMENT BLOCK, LEAD, ARROWS	43				
12	6	3	0	SECTION BLOCKS, ARROWS	44				
13	0	0	0	WATER GRADE, LEVELS	45				
14	7	0	4	CENTERLINES	46				
15					47				
16					48				
17	6	1	0	TEXT CALL–OUTS	49				
18	6	2	0	TEXT SUB–TITLES	50				
19	6	3	0	TEXT MAIN TITLES	51				
20					52				
21					53				
22					54				
23					55				
24					56				
25					57				
26					58				
27					59				
28					60				
29					61				
30					62	2	1	0	BORDER TEXT
31					63	3	2	0	REVISION, ADDENDA CLOUDS, TEXT
32									

DISCIPLINE LEVEL LOG : MECHANICAL

FIGURE A2–17

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DESIGN FILE LOG

CLEAN WATER PROGRAM
for Greater San Diego

File Name _____

Description DEMOLITION

Directory _____

Project Name / No. _____

Project Engineer _____ Log Originator _____

LV	CO	WT	LC	Level Description	LV	CO	WT	LC	Level Description
1	4	0	0	PROCESS PIPING TO BE REMOVED	33				
2	4	0	0	MECHANICAL EQUIPMENT	34				
3	4	0	0	BUILDING WALLS (INT & EXT)	35				
4	3	0	0	YARD PIPING	36				
5	3	0	0	PAVING & CONCRETE	37				
6	0	2	0	TEXT	38				
7					39				
8	0	0	0	AUTOMATIC DIMENSIONS	40				
9					41				
10					42				
11					43				
12					44				
13					45				
14					46				
15					47				
16					48				
17					49				
18					50				
19					51				
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23					55				
24					56				
25					57				
26					58				
27					59				
28					60				
29					61				
30					62	2	1	0	BORDER TEXT
31					63	3	2	0	REVISION, ADDENDA CLOUDS, TEXT
32									

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DISCIPLINE LEVEL LOG : DEMOLITION

FIGURE A2–16

DESIGN FILE LOG

CLEAN WATER PROGRAM
for Greater San Diego

File Name _____

Description STRUCTURAL

Directory _____

Project Name / No. _____

Project Engineer _____ Log Originator _____

LV	CO	WT	LC	Level Description	LV	CO	WT	LC	Level Description
1	1	0	4	GRIDLINES, STRUCT CL LINES & CELLS	33				
2	2	1	0	STRUCTURAL LAYOUT	34				
3	3	1	3	STRUCTURAL HIDDEN LINES	35				
4	4	1	0	LADDERS, METAL STAIRS	36				
5	4	0	6	RAILINGS	37				
6	4	0	0	GRATING	38				
7	5	3	0	REBAR	39				
8	7	1	0	AUTOMATIC DIMENSIONS, TEXT	40				
9	6	0	0	LEADER LINES	41				
10	6	1	0	TEXT	42				
11	7	0	0	DIMENSION LINES	43				
12	8	0	0	CONSTRUCTION JOINTS	44				
13	8	2	0	WATERSTOPS	45				
14	9	1	0	PIPES, UNDERDRAINS	46				
15	0	3	0	FRAMING	47				
16	1			STRUCTURAL FOOTPRINT	48				
17	2			MISCELLANEOUS	49				
18	5	0	3	REBAR (WHEN REQ'D)	50				
19					51				
20					52				
21					53				
22					54				
23					55				
24					56				
25					57				
26					58				
27					59				
28					60				
29					61				
30					62	2	1	0	BORDER TEXT
31					63	3	2	0	REVISION, ADDENDA CLOUDS, TEXT
32									

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DISCIPLINE LEVEL LOG : STRUCTURAL

FIGURE A2–15

DESIGN FILE LOG

CLEAN WATER PROGRAM
for Greater San Diego

File Name _____

Description ARCHITECTURAL – DETAILS

Directory _____

Project Name / No. _____

Project Engineer _____ Log Originator _____

LV	CO	WT	LC	Level Description	LV	CO	WT	LC	Level Description
1					33				
2	6	0	0	GRAPHIC SCALE /NORTH ARROW	34				
3					35				
4			0	MODULAR DETAIL REF GRID – LINES	36				EQUIPMENT (GENERAL)
5			0	MODULAR DETAIL REF GRID–TICKMARKS	37				EQUIPMENT (OWNER PURCHASED)
6					38				
7					39				
8					40	3	1	0	REFERENCE SYMBOLS & TEXT
9					41		0	0	MATCH LINES, BREAKLINES, TARGETS
10	0	0	4	COLUMN GRID (C/L)	42	3	1	0	DOOR NUMBERS & SYMBOLS
11			0	COLUMN GRID BUBBLES	43				WALLTYPE LABELS (LOLLIPOPS)
12					44				
13					45				
14					46	3	1	0	NOTES, MISC. TEXT
15					47			0	DETAIL TITLE & SCALE
16					48				
17					49				
18					50		0	0	DIMENSIONS, LEADER LINES
19					51				
20	2	1	0	COMPONENTS & STEEL SECTIONS	52				
21					53				
22					54				
23					55				
24					56				
25					57				
26					58				
27					59			0	SPEC NUMBERS
28					60				
29					61				
30					62	2	1	0	BORDER TEXT
31					63	3	2	0	REVISION, ADDENDA CLOUDS, TEXT
32									

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DISCIPLINE LEVEL LOG : ARCHITECTURAL – DETAILS

FIGURE A2–14

DESIGN FILE LOG

CLEAN WATER PROGRAM
for Greater San Diego

File Name _____

Description ARCHITECTURAL – CEILING

Directory _____

Project Name / No. _____

Project Engineer _____ Log Originator _____

LV	CO	WT	LC	Level Description	LV	CO	WT	LC	Level Description
1					33				
2	6	0	0	NORTH ARROW /GRAPHIC SCALE	34				
3					35	4		0	SPRINKLERS (CEILING, WALL)
4					36				
5					37				
6					38				HVAC – SUPPLY
7					39				HVAC – RETURN
8					40	3	1	0	REFERENCE SYMBOLS – SYMB. TEXT
9					41		0	0	MATCH LINES, BREAKLINES, TARGETS
10	0	1	0	WALL FIRE RATINGS	42			0	CEILING HGT. SYMBOLS/TEXT
11	5	0	0	CEILING PATTERN (GRID)	43				
12	5	0	0	CEILING PATTERN (PLASTER/GYP BD)	44				
13	5	0	0	CEILING PAT. (LINEAR METAL/WORK)	45	3	1	0	ROOM NAMES & NUMBERS
14	5	0	0	CEILING PATTERN (EXPOSED CONST)	46	3	1	0	NOTES, MISC. TEXT
15	5	0	0	CEILING PAT. (LEAD LNG, SOUND INS)	47		3	0	DWG COMPONENT TITLES & SCALES
16	6		0	CEILING PAT. (RENOVATION–EXIST)	48				
17	6		0	CLG PAT. (RENOVATION – REMOVAL)	49				
18	5	0	0	CEILING PATTERN (SHAFTS)	50		0	0	DIMENSIONS & LEADER LINES
19					51				
20	4	3	0	FLUORESCENT (RECESSED/STRIP)	52				
21	4	3	0	FLUORESCENT (SURFACE/SEMI RECESD)	53				
22	4		0	FLUORESCENT (WALL)	54				
23	4	1	0	INCANDESCENT (RECESSED)	55				
24	4	1	0	INCANDESCENT (SURF/SEMI RECESD)	56				
25	4		0	INCANDESCENT (WALL)	57				
26	4		0	H.I.D. (RECESSED)	58				
27	4		0	H.I.D. (SURFACE)	59			0	SPEC NUMBERS
28	4		0	H.I.D. (WALL)	60			0	CEILING HT SYMBOLS & NUMBERS
29	4		0	EXIT LIGHTS	61				
30	4		0	SMOKE /HEAT DETECTORS (ELEC)	62	2	1	0	BORDER TEXT
31	4	1	0	COMUNICATIONS (SPEAKERS)	63	3	2	0	REVISIONS, ADDENDA, CLOUDS, TEXT
32	4		0	CLOCKS					

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DISCIPLINE LEVEL LOG : ARCHITECTURAL – CEILING

FIGURE A2–13

DESIGN FILE LOG

CLEAN WATER PROGRAM
for Greater San Diego

File Name _____

Description ARCHITECTURAL – SECTION /ELEVATION

Directory _____

Project Name / No. _____

Project Engineer _____ Log Originator _____

LV	CO	WT	LC	Level Description	LV	CO	WT	LC	Level Description
1					33				
2	6	0	0	GRAPHIC SCALE /NORTH ARROW	34				
3					35	2	0	5	CASEWORK, MILLWORK
4		2	0	GRADE LINE	36	2		0	EQUIP (X–RAY, COMPUTERS)
5					37	2		0	EQUIP (OWNER PURCHASED)
6					38				
7					39				
8					40	3	1	0	REFERENCE SYMBOLS, TEXT
9					41		0	0	MATCH LINES, BREAKLINES, C/L, TARGETS
10	0	0	4	COLUMN GRID C/L	42				FLOOR ELEV, TAGS, ELEVATIONS
11		1	0	COLUMN GRID TAGS	43				
12	4		0	COLUMNS	44				
13				FINISH FLOOR LINES, TARGETS	45	3	1	0	ROOM NAMES, NUMBERS
14					46	3	1	0	NOTES, MISC TXT, F FLR, LINE EL
15	4	1	0	WALL EDGES, CURTAIN WALL	47				ELEVATION & SECTION TITLES, SCALES
16	4		0	WINDOWS, SILLS	48				LEGEND GRAPHICS
17	4	0	0	STAIRS	49	3	1	0	LEGEND TEXT
18		0	0	LOUVERS	50		0	0	DIMENSIONS, LEADER LINES
19					51				
20	2	1	0	COMPONENTS, STEEL SECTIONS	52				
21					53				
22					54				
23					55				
24					56				
25	4	3	0	DOORS, FRAMES	57				
26					58				LARGE SCALE DWG INFORMATION
27					59		1	0	SPEC NUMBERS
28					60	1	0	4	WALL PARTITION C/L
29					61				
30	2	1	0	PLUMBING FIXTURES	62	2	1	0	BORDER TEXT
31	2		0	TOILET PTS, HANDICAP HANDRAILS	63	3	2	0	REVISION, ADDENDA CLOUDS, TEXT
32									

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DISCIPLINE LEVEL LOG : ARCHITECTURAL – SECTION/ELEVATION

FIGURE A2–12

DESIGN FILE LOG

CLEAN WATER PROGRAM
for Greater San Diego

File Name _____

Description ARCHITECTURAL – FLOOR PLANS

Directory _____

Project Name / No. _____

Project Engineer _____ Log Originator _____

LV	CO	WT	LC	Level Description	LV	CO	WT	LC	Level Description
1					33			0	RENOV (PLUMBING FIX TO REMOVE)
2	6	0	0	GRAPHIC SCALE /NORTH ARROW	34			0	PLUMBING REFERENCE NOTES
3					35	2	0	0	CASEWORK /MILLWORK
4	5		0	BUILDING FOOTPRINTS (FLR PERIMETER)	36	2		0	GEN. EQUIP (X–RAY, COMPUTERS,)
5	5		0	ROOM PERIMETER SHAPE	37	2		0	EQUIP (OWNER PURCHASED)
6	5		0	EXTERIOR PERIMETER SHAPE	38		0	4	BEAM CENTERLINES
7					39				CEILING REF (DROPS, BULKHEADS)
8	1	0	4	CURTAIN WALL CENTERLINES	40	4	2	0	REFERENCE SYM, SYMBOL TEXT
9	4		0	CURTAIN WALL MULLIONS & GLASS	41		0	0	MATCH LINES, BREAKLINES, C/L, TARGETS
10	0	0	4	COLUMN GRID (C/L ONLY)	42	3	1	0	DOOR SYMBOLS
11		1	0	COLUMN GRID TAGS	43	3	1	0	WINDOW SYMBOLS (NUMBER)
12	4		0	COLUMNS	44		1	0	WALL FIRE RATING
13					45	3	1	0	ROOM NUMBERS
14		1	0	CAVITY WALL LINES	46	3	0	0	NOTES, MISC TEXT, TERMS
15	4	1	0	EXTERIOR WALL EDGES	47		3	0	DWG COMPONENT TITLES & SCALES
16	4		0	WINDOWS, SILLS	48			0	LEGEND, SCHEDULE GRAPHICS
17	2		0	ROOM NAMES & UNDER LINES	49	3	1	0	LEGEND, SCHEDULE TEXT
18	3	0	0	SHAFTS	50		0	0	DIMENSIONS, LEADER LINES
19	3	0	0	ELEVATORS, ESCALATORS	51				
20	4	0	0	STAIRS, HANDRAILS, BREAKLINES	52				
21	6	0	0	BEAM EDGES	53				
22	6		0	SLABS	54				
23	4	1	0	INTERIOR WALL EDGES	55				
24	4	1	0	STRUCTURAL WALL EDGES	56	3	1	0	ELECTRICAL REFERENCE NOTES
25	4	3	0	DOORS, DOOR SWINGS	57	3	1	0	HVAC REFERENCE NOTES
26	4	3	0	DOOR FRAMES	58	3	1	0	STRUCTURAL REFERENCE NOTES
27					59		1	0	SPEC NUMBERS
28			0	RENOVATION (ITEMS TO REMAIN)	60	1	0	0	WALL & PARTITION C/L
29			0	RENOVATION (ITEMS TO BE REMOVED)	61				
30	2	1	0	PLUMBING FIXTURES (TUBS, SHOWERS)	62	2	1	0	BORDER TEXT
31			0	TOILET PART & HANDICAP RAILS	63	3	2	0	REVISION, ADDENDA CLOUDS, TEXT
32			0	RENOV (PLUMBING FIX TO REMAIN)					

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DISCIPLINE LEVEL LOG : ARCHITECTURAL – FLOOR PLANS

FIGURE A2–11

DESIGN FILE LOG

CLEAN WATER PROGRAM
for Greater San Diego

File Name _____

Description PROPOSED LANDSCAPE AND IRRIGATION

Directory _____

Project Name / No. _____

Project Engineer _____ Log Originator _____

LV	CO	WT	LC	Level Description	LV	CO	WT	LC	Level Description
1	2	1	0	PLANTING – TREES, SHRUBS	33				
2	2	1	0	PLANTING – GRASS, GROUND COVERS	34				
3	5	3	0	PIPING – IRRIGATION	35				
4	5	3	2	PIPING – HIDDEN LINES	36				
5	0	1	0	TEXT – CALL–OUTS, NOTES	37				
6	0	2	0	TEXT – SUB TITLES	38				
7	0	0	0	EQUIPMENT BLOCK, LEAD ARROW	39				
8	0	0	0	AUTOMATIC DIMENSIONS	40				
9					41				
10					42				
11					43				
12					44				
13					45				
14					46				
15					47				
16					48				
17					49				
18					50				
19					51				
20					52				
21					53				
22					54				
23					55				
24					56				
25					57				
26					58				
27					59				
28					60				
29					61				
30					62	2	1	0	BORDER TEXT
31					63	3	2	0	REVISION, ADDENDA CLOUDS, TEXT
32									

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DISCIPLINE LEVEL LOG : PROPOSED LANDSCAPE/IRRIGATION

FIGURE A2–10

DESIGN FILE LOG

CLEAN WATER PROGRAM
for Greater San Diego

File Name _____

Description CIVIL – TRAFFIC CONTROL

Directory _____

Project Name / No. _____

Project Engineer _____ Log Originator _____

LV	CO	WT	LC	Level Description	LV	CO	WT	LC	Level Description
1					33				
2					34				
3	4	1	0	FLAGGING – FLAGMAN	35	3	2	2	TRAFFIC STANDARD & HEAD
4	3	1	0	BARRIER (JERSEY BARRIERS, K RAILS)	36	0	1	6	PROPOSED STRIPING
5					37				
6					38				
7					39				
8					40				
9					41				
10					42				
11	2	1	0	DETOURS – TEMP & PROPOSED	43				
12	2	1	0	MODIFICATIONS	44				
13	2	1	0	BETTERMENTS	45				
14	0	0	6	PROPOSED PAINTING	46				
15					47				
16					48				
17					49				
18					50				
19					51				
20					52				
21					53				
22					54				
23					55				
24					56				
25					57				
26					58				
27					59				
28					60				
29					61				
30					62	2	1	0	BORDER TEXT
31					63	3	2	0	REVISION, ADDENDA CLOUDS, TEXT
32									

DISCIPLINE LEVEL LOG : CIVIL – TRAFFIC CONTROL

FIGURE A2–9

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DESIGN FILE LOG

CLEAN WATER PROGRAM
for Greater San Diego

File Name _____

Description CIVIL– PROFILE

Directory _____

Project Name / No. _____

Project Engineer _____ Log Originator _____

LV	CO	WT	LC	Level Description	LV	CO	WT	LC	Level Description
1					33				
2					34				
3					35	3	0	2	TRAFFIC SIGNAL CONDUIT
4					36				
5				PROPOSED GRADE	37				
6					38	3	0	2	STREET LIGHT CONDUIT
7					39				
8					40	3	0	2	ELECTRICAL CONDUIT
9					41	4	0	6	GAS LINES & APPURTENANCES
10					42	6	0	2	TELEPHONE & APPURTENANCES
11					43	6	0	2	CABLE TV & APPURT. W /ANNOT.
12					44	4	0	1	STEAM, CHILLED WATER LINES
13					45				
14					46	5	0	1	MISCELLANEOUS UNDERGROUND
15					47				
16					48				
17					49				
18					50				
19					51				
20	1	1	3	WATER LINES, APPURTENANCES W/ANNOT.	52				
21	1	1	3	WATER SERVICES (BOXES) W /ANNOT.	53				
22	2	1	7	SEWER MAINS, APPURTENANCES W/ANNOT.	54				
23	2	1	7	SEWER LAT, CLEANOUTS, W/ANNOT.	55				
24	2	6	0	PROPOSED SEWER	56				
25	2	1	0	PROPOSED SEWER ANNOTATION	57				
26	1	6	3	PROPOSED POTABLE WATER	58				
27	1	1	0	PROPOSED POTABLE WATER ANNOT.	59				
28	5	6	1	PROPOSED RECLAIMED WATER	60				
29	5	1	0	PROPOSED RECLAIMED WATER ANNOT.	61				
30	7	1	2	STORM DRAIN, CULVERTS, DITCHES, CHANNELS	62	2	1	0	BORDER TEXT
31	7	1	0	STORM DRAIN, CULVERT, ETC. ANNOTATION	63	3	2	0	REVISION, ADDENDA CLOUDS, TEXT
32									

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DISCIPLINE LEVEL LOG : CIVIL – PROFILE

FIGURE A2–8

DESIGN FILE LOG

CLEAN WATER PROGRAM
for Greater San Diego

File Name _____

Description CIVIL – PIPING

Directory _____

Project Name / No. _____

Project Engineer _____ Log Originator _____

LV	CO	WT	LC	Level Description	LV	CO	WT	LC	Level Description
1	2	8	0	MAJOR PROCESS PIPING	33				
2	2	5	0	MINOR PROCESS PIPING	34				
3					35				
4					36				
5	3	0	4	PROJECT ALIGNMENT W/ANNOT.	37				
6	3	3	4	STREET C/L & ROW W/ANNOT.	38				
7					39				
8					40	3	3	2	ELECTRIC W/ANNOTATION
9					41	4	3	2	GAS W/ANNOTATION
10					42	6	3	2	TELEPHONE W/ANNOTATION
11					43				
12					44	4	0	1	STEAM & CHILLED WATERLINES
13					45				
14					46				
15					47				
16					48				
17					49				
18					50				
19					51				
20					52				
21					53				
22					54				
23					55				
24	2	6	0	PROPOSED SEWER	56				
25	2	1	0	PROPOSED SEWER ANNOTATION	57				
26	1	6	3	PROPOSED POTABLE WATER	58	5	1	0	GRAPHIC SCALE, NORTH ARROW
27	1	1	0	PROPOSED POTABLE WATER ANNOT.	59				
28	5	6	1	PROPOSED RECLAIMED WATER	60				
29	5	1	0	PROPOSED RECLAIMED WATER ANNOT.	61				
30					62	2	1	0	BORDER TEXT
31					63	3	2	0	REVISION, ADDENDA CLOUDS, TEXT
32									

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DISCIPLINE LEVEL LOG : CIVIL – YARD PIPING

FIGURE A2–7

DESIGN FILE LOG

CLEAN WATER PROGRAM
for Greater San Diego

File Name _____

Description CIVIL – GRADING AND DRAINAGE

Directory _____

Project Name / No. _____

Project Engineer _____ Log Originator _____

LV	CO	WT	LC	Level Description	LV	CO	WT	LC	Level Description
1	V	V	V	SECTION, DETAIL BLOCKS	33	7	2	0	HEADWALL, ENERGY DISSIPATOR, ETC.
2					34				
3	V	V	V	SECTION LINES	35				
4					36				
5					37				
6					38				
7					39				
8					40				
9					41				
10	1	0	0	MINOR CONTOURS	42				
11	0	0	0	MINOR CONTOUR ANNOTATIONS	43				
12	2	1	0	MAJOR CONTOURS	44				
13	4	0	0	MAJOR CONTOUR ANNOTATIONS	45				
14	0	0	0	SPOT ELEVATION W /TEXT	46				
15					47				
16					48				
17					49				
18					50				
19					51				
20					52				
21					53				
22					54				
23					55	3	0	0	SURFACE ZERO TRIANGLES
24					56				
25					57				
26					58	5	1	0	GRAPHIC SCALE, NORTH ARROW
27					59				
28					60				
29					61				
30	7	2	2	STORM DRAIN, CULVERTS, DITCHES, CHANNELS	62	2	1	0	BORDER TEXT
31	7	2	0	INLETS, SD CO'S, CATCH BASINS	63	3	2	0	REVISION, ADDENDA CLOUDS, TEXT
32									

DISCIPLINE LEVEL LOG : CIVIL – GRADING AND DRAINAGE

FIGURE A2–6

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DESIGN FILE LOG

CLEAN WATER PROGRAM
for Greater San Diego

File Name _____

Description CIVIL – HORIZONTAL CONTROL & PAVING

Directory _____

Project Name / No. _____

Project Engineer _____ Log Originator _____

LV	CO	WT	LC	Level Description	LV	CO	WT	LC	Level Description
1					33				
2					34				
3					35				
4					36	0	0	6	PAINTED TRAFFIC STRIPING
5	3	0	4	PROJECT ALIGNMENT W/ANNOT.	37				
6	3	0	4/6	STREET C/L, ROW W /ANNOT.	38				
7					39				
8					40				
9	2	0	0	SCORE /JOINTING	41				
10	2	2	0	SCORE /JOINTING TEXT	42				
11					43				
12					44				
13					45				
14					46				
15					47				
16	0	0	0	EDGE OF PVMT, PK LOTS, ETC.	48				
17					49				
18					50				
19					51				
20					52				
21					53	V	V	V	DIMENSIONS – NEW CONST.
22					54	V	V	V	COORDINATES –NEW CONST.
23					55				
24					56				
25					57				
26					58	5	1	0	GRAPHIC SCALE, NORTH ARROW
27					59				
28					60				
29					61				
30					62	2	1	0	BORDER TEXT
31					63	3	2	0	REVISION, ADDENDA CLOUDS, TEXT
32									

DISCIPLINE LEVEL LOG : CIVIL – HORIZONTAL CONTROL & PAVING

FIGURE A2–5

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DESIGN FILE LOG

CLEAN WATER PROGRAM
for Greater San Diego

File Name _____

Description CIVIL – PROJECT PLANIMETRICS

Directory _____

Project Name / No. _____

Project Engineer _____ Log Originator _____

LV	CO	WT	LC	Level Description	LV	CO	WT	LC	Level Description
1					33				
2					34				
3					35				
4					36				
5	3	2	4	PROJECT ALIGNMENT W/ANNOT.	37	4	1	0	STREET LIGHTS & HANDHOLDS
6	3	2	4	STREET C/L & ROW W/ANNOT.	38				
7	4	1	4	LOT LINES & EASEMENTS	39				
8					40				
9					41				
10					42				
11					43				
12					44				
13					45				
14					46				
15	0	2	0		47	3	3	2	FUTURE ELECTRIC W/ANNOT.
16	6	2	0	EDGE OF SIDEWALK, CURB, GUTTER, PK LOTS	48	4	3	2	FUTURE GAS W/ANNOT.
17	2	3	0	BUILDING OUTLINES, STRUCTURES	49	6	3	2	FUTURE TELEPHONE W/ANNOT.
18					50				
19	2	1	4	FUTURE STRUCTURES	51				
20					52				
21					53				
22					54				
23					55				
24					56				
25					57				
26					58	5	1	0	GRAPHIC SCALE, NORTH ARROW
27					59				
28					60				
29					61				
30					62	2	1	0	BORDER TEXT
31					63	3	2	0	REVISION, ADDENDA CLOUDS, TEXT
32									

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DISCIPLINE LEVEL LOG : CIVIL – PROJECT PLANIMETRICS

FIGURE A2–4

DESIGN FILE LOG

CLEAN WATER PROGRAM
for Greater San Diego

File Name _____

Description CIVIL– EXISTING UTILITIES

Directory _____

Project Name / No. _____

Project Engineer _____ Log Originator _____

LV	CO	WT	LC	Level Description	LV	CO	WT	LC	Level Description
1					33				
2					34				
3					35	3	0	2	TRAFFIC SIGNAL CONDUIT
4					36				
5					37				
6	3	0	4/6	STREET C/L & ROW W /ANNOT.	38	3	0	2	STREET LIGHT CONDUIT
7	4	0	0/4	LOT LINES, EASEMENTS	39				
8					40	3	0	2	ELECTRICAL CONDUIT
9					41	4	0	6	GAS LINES & APPURTENANCES
10					42	6	0	2	TELEPHONE & APPURTENANCES
11					43	6	0	2	CABLE TV & APPURT. W /ANNOT.
12					44	4	0	1	STEAM, CHILLED WATER LINES
13					45				
14					46	5	0	1	MISCELLANEOUS UNDERGROUND
15					47				
16					48				
17					49				
18					50				
19					51				
20	1	1	3	WATER LINES, APPURTENANCES	52				
21	1	1	3	WATER SERVICES (BOXES) W /ANNOT.	53				
22	2	1	7	SEWER MAINS , APPURTENANCES	54				
23	2	1	7	SEWER LAT, CLEANOUTS, W/ANNOT.	55				
24	1	1	0	WATER MAIN ANNOTATION	56				
25	2	1	0	SEWER MAIN ANNOTATION	57				
26					58	5	1	0	GRAPHIC SCALE, NORTH ARROW
27					59				
28					60				
29					61				
30	7	1	2	ST DRAIN, CULVERTS, DITCHES, CHANNELS	62	2	1	0	BORDER TEXT
31	7	1	0	INLETS, CLEANOUTS, ETC. ANNOTATION	63	3	2	0	REVISION, ADDENDA CLOUDS, TEXT
32									

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1/22/2005

DISCIPLINE LEVEL LOG : CIVIL – EXISTING UTILITIES

FIGURE A2–3

CADD DIRECTORY STRUCTURE

CLEAN WATER PROGRAM
for Greater San Diego

Consultant	Date	Document Control #
Site	Contract	Task

In the space below, list each directory with its logical directory name (if any), full directory path, and a brief explanation of its usage including discipline and file type.

Logical Directory Name	Full Directory Path	Discipline / File Type

Originated By:	Date:

C:\MyDgnFiles\levelog\a2_21.dgn x3de
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CADD DIRECTORY STRUCTURE LOG
FIGURE A2-21

the ".dgn" extension. The drawing number is that shown in the standard title block in the box labeled "DRAWING NO.". For example, Drawing Number C-12 of the Point Loma HOG project would have a file name like "plomahog-c-12.dgn" where "C-12" are the last characters in the CADD file name before the extension ".dgn".

TYPES OF FILES

When engineering application software is used to produce design files, the DESIGN CONSULTANT shall deliver all supporting parameter files and database files in addition to the resulting CADD design files.

REFERENCE FILE ATTACHMENT

Reference file attachment shall use the *"Save Full Path"* attachment setting.

ARCHIVAL STORAGE

In accordance with the General Contractual Guidelines, mylar plots will be the primary deliverables for engineering drawings. However, a set of computer files corresponding to each set of drawings delivered at each milestone shall be transmitted to the Project Manager in compliance with Table 12-1 of Chapter 12, Volume I of the CWP Guidelines. The CADD File Transmittal Form shall have a notation indicating the milestone in the status column of 30%, 60%, 90%, 100% level design drawings, including as-bid and as-built drawings submittals.

A2.4 DESIGN FILE UNITS AND GRAPHICS

SEED FILES

Seed files (blank files) will be furnished to the DESIGN CONSULTANT by the Project Manager. Each of the disciplines listed below will have seed files containing parameter settings that meet the needs of the specific application.

1. Aerial surveys, site design, plan and profile sheets, and design work using the INROADS civil engineering software

2. Mechanical, structural, and electrical design

3. Architectural design using the APDP and Project Architect software

4. Process and instrumentation schematic drawings produced using the PDS software

5. General non-scaled drawings and figures

WORKING UNITS

For civil site design drawings, including aerial surveys, the seed file working units will be 1:10:1000. Each master unit (MU) is one foot, each subunit (SU) is one-tenth of a foot, and each positional unit (PU) is one-thousandth of a subunit. This results in design file resolution of one ten-thousandth of a foot, and a design plane that is 429,496 square feet in size.

For mechanical, structural, and electrical design, the seed file working units will be 1:12:1000. Each MU is one foot, each SU is one inch, and each PU is one-thousandth of an inch. This provides for dimensioning on construction drawings in the conventional English units of feet and inches.

For architectural design using APDP and Project Architect, the seed file working units will be 1:12:8000.

For process and instrumentation schematic drawings produced using PDS, the seed file working units will be 1:254:100.

GLOBAL ORIGIN

The global origin for general drawings, including mechanical scaled drawings and schematic diagrams, is the center of the MicroStation design plane. In response to the "GO=?" keyed input, a three-dimensional file shall display GO = 214748.36, 214748.36, 214748.36. For a two-dimensional file, omit the third value.

For aerial survey files, the City of San Diego Survey Section, Engineering and Capital Projects Department, has established global origin values that make the MicroStation design plane capable of mapping the City of San Diego boundary when using Lambert

Zone 6 Coordinate values in NAD83. The CWP has adopted the same global origin values for aerial survey files, civil drawings, and any design files used in conjunction with site locations. For a three-dimensional file, the values are:

NAD83: GO = -6165251.6353, -1772251.6353, 214748.36

For a two-dimensional file, omit the third value (214,748.36). The numbers are shown in the displayed format. If it is necessary to set the global origin of a file, key in the values listed above with the opposite algebraic sign.

It is important to note that the DESIGN CONSULTANT shall be required to use NAD83.

GRID UNITS

The standard for grid units depends on the type of file and its associated working units. For files with WU=1:10:1000, the grid units are one minor grid per subunit, and one major grid per 10 subunits, so there is one major grid per foot. For files with

WU=1:12:1000, one minor grid per subunit and one major grid per 12 subunits also puts one major grid per foot. Schematic drawings are drawn for plotting at 1:1 scale, so the preferred grid units are 2.54 subunits per minor grid and 10 minor grids per major grid, resulting in 1 major grid per inch of plotted output.

CADD DESIGN FILE PARAMETERS

Table A2-1

ENGINEERING DISCIPLINE	WORKING UNITS MU:SU:PU	GLOBAL ORIGIN X,Y,Z (Z FOR 3D FILES ONLY)	SEED FILE NAME, DRAWING BORDER
CIVIL ENGINEERING, AERIAL SURVEYS, SITE DESIGN, PLAN AND PROFILES, INROADS SOFTWARE	1:10:1000	NAD83 -6165251.6353 -1772251.6353 214748.36 CENTER OF DESIGN PLANE	SEED10.2D SEED10.3D BORDER10.DGN
MECHANICAL ENGINEERING	1:12:1000	214748.36 214748.36 214748.36	SEED12.2D SEED12.3D BORDER12.DGN
STRUCTURAL ENGINEERING	1:12:1000	214748.36 214748.36 214748.36	SEED12.2D SEED12.3D BORDER12.DGN
ELECTRICAL ENGINEERING	1:12:1000	214748.36 214748.36 214748.36	SEED12.2D SEED12.3D BORDER12.DGN
ARCHITECTURAL DESIGN, PROJECT ARCHITECT SOFTWARE	1:12:8000	214748.36 214748.36 214748.36	PROVIDED WITH SOFTWARE
SCHEMATIC DRAWINGS PRODUCED BY PLANT DESIGN SYSTEM SOFTWARE	1:100:254	214748.36 214748.36 214748.36	PROVIDED WITH SOFTWARE
SCHEMATIC DRAWINGS, GENERAL NON-SCALED DRAWINGS AND FIGURES	1:12:1000	214748.36 214748.36 214748.36	SEED12.2D SEED12.3D BORDER12.DGN

LINE WEIGHT

Standard line weights shall be implemented using special pen tables provided by the Project Manager and the MicroStation Plotting Software IPLOT. Screen displays are not controlled. The proper line weights for D-size plots (22 x 34 inches) are shown on Figure A2-22. The line weights for half-size plots (11 x 17 inches) are half as thick.

To produce standard line weights on a D-size plot, use IPLOT and pen table “full.tbl”. To produce standard line weights for a half-size plot, (11x17 inches), use pen table “half.tbl”. These pen tables will be provided to the DESIGN CONSULTANT by the Project Manager.

LINE STYLE

Standard line styles are shown on Figure A2-23.

COLOR (NOT USED)

BORDER

The Clean Water Program border CADD file will be provided by the Project Manager. It shall always be a reference file.

FILE PROTECTION

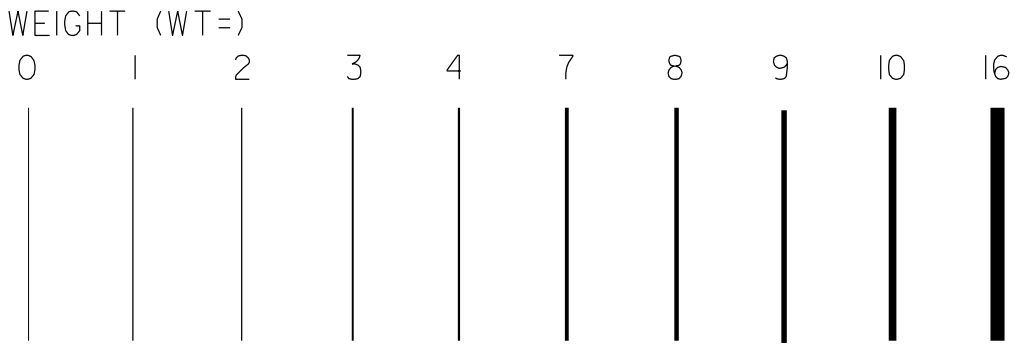
The DESIGN CONSULTANT shall submit files with “read-only” protection.

A2.5 REFERENCE FILES AND LOGICAL NAMES

REFERENCE FILE DOCUMENTATION

The DESIGN CONSULTANT shall write all reference file attachments on the back of the Design File Log (see Figures A2-25 and A2-26). In addition, the same information hall be recorded in the computerized version of the Design File Log, located on level 61 (same level as the Border) in each design file just outside the Border.

STANDARD WEIGHTS



EQUIVALENT RAPIDOGRAPH POINT SIZE:

00	0	1	2	2.5	3	3.5	4	6	7

THICKNESS IN INCHES:

.012	.014	.020	.024	.028	.031	.039	.047	.055	.079

NOTES:
1. THE LINES ABOVE ARE THE ACTUAL THICKNESS THAT SHOULD APPEAR ON A D-SIZE SHEET.

2. PEN TABLE FULL.TBL SHOULD BE USED FOR FINAL PLOT SIZE. PEN TABLE HALF.TBL SHOULD BE USED FOR ANY REDUCED PLOT SIZE.

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11/22/2005

STANDARD WEIGHTS
FIGURE A2-22

STANDARD LINE STYLES

LC=0	————————————	SOLID
LC=1	----------	DOTTED
LC=2	- - - - - - - - - -	MEDIUM DASH
LC=3	— — — — — — — — — -	LONG DASH
LC=4	—·—·—·—·—·—·—·—·—	DOT DASH
LC=5	----------	SHORT DASH
LC=6	—··—··—··—··—··—··—	DASH DOT DOT
LC=7	—-——-——-——-——-——-	LG/DASH SHT/DASH

NOTE: LINES ABOVE ARE AT WEIGHT (WT) =1

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STANDARD LINE STYLES
FIGURE A2–23

DESIGN FILE LOG

CLEAN WATER PROGRAM
for Greater San Diego

File Name _____

Description _____

Directory _____

Project Name / No. _____

Project Engineer _____ Log Originator _____

LV	CO	WT	LC	Level Description	LV	CO	WT	LC	Level Description
1					33				
2					34				
3					35				
4					36				
5					37				
6					38				
7					39				
8					40				
9					41				
10					42				
11					43				
12					44				
13					45				
14					46				
15					47				
16					48				
17					49				
18					50				
19					51				
20					52				
21					53				
22					54				
23					55				
24					56				
25					57				
26					58				
27					59				
28					60				
29					61				
30					62				
31					63				
32									

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DESIGN FILE LOG
FIGURE A2–25

Reference Files

No.	Logical Directory	File Name	Logical Name	Description	No.	Logical Directory	File Name	Logical Name	Description
1					17				
2					18				
3					19				
4					20				
5					21				
6					22				
7					23				
8					24				
9					25				
10					26				
11					27				
12					28				
13					29				
14					30				
15					31				
16					32				

Plotting

Queue: ☐ plotter ☐ lasera ☐ laserb

Size: ☐ 8.5 x 11 ☐ 11 X 17 ☐ 22 X 34 ☐ _____

Scale: ☐ 1:1 ☐ 2:1 ☐ _____

Pen Table: ☐ cw:pen1.tbl ☐ cw:pen2.tbl ☐ none

Color Table: ☐ cw:bw.ctb ☐ none

Patterning

LV	PS	PA	PD	Cel Lib	Pattern	Description

Saved Views / Miscellaneous

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REVERSE SIDE OF DESIGN FILE LOG
FIGURE A2–26

LOGICAL NAMES

Logical names for attaching reference files to design files may be used, but they are not required.

A2.6 METHODS

SCHEMATIC DRAWINGS

A schematic drawing is distinguished by its representation of relationships without reference to physical location or size. Some examples of schematic drawings are Process Flow Sheets, Process and Instrumentation Diagrams, Electrical Schematics, and Electrical Logic Diagrams.

Every schematic drawing shall be created using the following steps:

1. Consider the master unit of the design file as equivalent to the plotter unit. This makes one foot in the design plane equal to one inch on the final paper output.

2. Make all plots with scale 1:1.

3. Design an entire process unit or other conceptual item in a single master design file. Disregard "sheet count" while designing.

4. Generate plotted sheets from the completed design using an essentially empty file to represent each plot.

5. The first reference file attached to the sheet file is the border. This must be coincident, not moved, rotated, or scaled.

6. The second reference file is the one containing the schematic design. It may be moved, but not rotated or scaled, until a suitable part of the design is inside the border. The command "clip boundary" is then used to limit the display.

7. All symbols and text that are specific to a single sheet are then added to the empty design file. Typical items are off-page connectors, isolated notes, and drawing name.

SCALED DRAWINGS

Scaled drawings represent physical structures, their sizes, and relative locations with accurate proportion. Examples of scaled drawings are civil, mechanical, and structural plans. The following steps shall be followed to build a two-dimensional model and generate engineering drawings from it.

1. Consider one master unit in the design file as equal to one foot "on the ground" for civil, or one foot of physical size for equipment or building construction.

2. Perform CADD design with actual measurements, using precision placement commands.

3. Plan the size of text, including symbols, and cells for plotting at a specific scale.

4. Design an entire process unit or other facility in a single master design file. Disregard "sheet count" while designing.

5. Generate plotted sheets from the completed design using an essentially empty file to represent each plot.

6. The first reference file attached to the sheet file is the border.

7. Turn on the appropriate levels in reference files. Some things, like notes pertaining to a background, may be turned off.

8. Reference files can also be scaled within a single discipline in a situation where two types of information are plotted on a single sheet using different scales. A combination of plans and sections is one example.

9. All symbols and text that are specific to a single sheet are then added to the empty design file. Typical items are off-page connectors, isolated notes, and drawing name.

A2.7 CELL LIBRARIES

During the design of a project, the DESIGN CONSULTANT will use many standard symbols (cells) to display information in graphic form. These cells are stored in cell libraries, from which they can be copied and placed into individual design files. The symbol graphics, color, line weight, line code, and text parameters (if any) are fixed when the cell is created and stored in a library.
Cell libraries shall conform with the symbology used by the Clean Water Program Guidelines, as shown in Section A1 - Drafting Standards, also shown on the Reference Sheets (Figures R-1 to R-7) in Volume IV of the Guidelines.

The DESIGN CONSULTANT shall use the Cell Library Log (Figure A2-27) to record all pertinent facts about each cell that is stored in each library. In addition, the DESIGN CONSULTANT shall use the Cell Design Log (Figure A2-28) to document the cell's appearance, inherent characteristics, type (point, normal, or menu), and placement instructions for relative versus absolute level, active scale, and active angle.

Cells in design files must maintain their status as a complex element. Complex status must not be dropped unless there is a specific reason, such as modifications to the symbol.

Cell libraries used on the Clean Water Program are project deliverables and shall be transmitted along with the design files.

A2.8 FONT LIBRARIES AND TEXT PARAMETERS

Standard text styles are shown in Figure A2-29. Only upper-case characters shall be used for all lettering. All text shall be a minimum 0.12 inches in height when plotted on D-size sheets.

FONT LIBRARIES

The standard font library includes fonts 1, 26, 50, 77, and 102
MicroStation Font 1 will be the basic text font. It is a straight (not slanted), proportionally-spaced, non-area fill (stick) font. General drawing annotation shall be done using this font. Font 26 will be used for Greek letters, when needed as scientific or mathematical symbols. Font 50 is a straight, mono-spaced, non-area fill font that will be used for charts and columnar tabulations. Font 77 is a filled font that appears in the standard border. Font 102 is the MicroStation symbol font.

The DESIGN CONSULTANT may use other fonts for specific purposes chosen from the MicroStation selection or created by the DESIGN CONSULTANT. All Font libraries used on the drawings shall be transmitted along with the design files.

TEXT PARAMETERS

Uniformity in text size as well as style is to be maintained. The minimum text height for D-size plots (22 x 34 inches) will be 0.12 inches. Normally text width will be equal to text height and spacing between lines will be equal to one-half of text height.

Planning is required to create text which has the proper size after plotting. Since design work is done using actual physical measurements, often called "real world units", but plotters generate output on paper measured in "plotter units", some calculation is needed. In the examples below, notice that scale is multiplied by 0.12 to determine the text size parameter.

The following are examples of parameters for 0.12 inch text after plotting. Design file working units of 1:10:1000 with Master Unit "foot" assumed.

1. Schematic drawing, plotted at scale 1 inch (plotter unit) equals 1 foot (master design unit), needs TX = 0.12.

2. Scaled drawing, plotted at scale 1 inch (plotter unit) equals 40 feet (master design units), needs TX = 4.80.

3. Scaled drawing, plotted at scale 1 inch (plotter unit) equals 200 feet (master design units), needs TX = 24.00.

A2.9 LEVEL STRUCTURE

Standards for level structure and symbology are shown in the CADD Project Level Logs (Figures A2-1 through A2-20). The DESIGN CONSULTANT shall create design files according to these standards, then shall use a Design File Log (see Figures A2-25 and A2-26) to record which of the assigned levels were actually used in each file and to note any information placed in a level that is left unassigned in the standard. The same facts shall be entered in the computerized version of the Design File Log, which shall appear in each design file, located on level 61 (same level as border) just outside the border.

LEVEL CONTENT AND SYMBOLOGY

The DESIGN CONSULTANT shall adhere to the designated content per level shown in the CADD Project Level Logs (Figures A2-1 through A2-20). A distinctive symbology shall be produced for each level by following the assigned color, weight, and line code for each level, also shown in the CADD Project Level Logs. Disciplines such as Civil, Architectural, Landscaping, Structural, Mechanical, HVAC, Electrical, and Instrumentation each has one or more applicable logs. The DESIGN CONSULTANT shall establish a similar predefined log for any specialty that is not covered and shall transmit that log to the Project Manager.

A2.10 PLOTTING

The DESIGN CONSULTANT shall produce D-size sheets for most drawings. The outer edge of D-size paper is 22 x 34 inches. The size of the plotted border will be somewhat smaller, to provide for margins.

The Project Manager project manager will furnish a design file containing the Clean Water Program border. Included in this design file is an extra rectangle, measuring exactly 22 x 34 inches when plotted at 1:1 scale, for use as an aid in accurately scaled plotting. As described previously, the border file is attached as a reference file, then scaled appropriately depending on the planned plotting scale.

The Project Manager will furnish a black and white color table, two pen tables for controlling line weight, and two pen tables for screening contours when aerial survey files are used as reference files. These shall be used for all CADD drawings.

PLOTTING PROCEDURE

The DESIGN CONSULTANT shall document all plotting instructions on the back of the Design File Log (Figure A2-25) to assist the Project Manager in re-creating consistent plots.

A2.11 TRANSMITTAL

The DESIGN CONSULTANT shall transmit only one version of each file, including all required reference files, and shall not transmit unnecessary files.

CADD TRANSMITTAL FORM

All CADD files and electronic files of the CADD Transmittal Form (Figure A2-30) shall be submitted to the Project Manager, unzipped, on a standard CD.

CADD ACCEPTANCE FORM

The Project Manager will receive each delivery from the DESIGN CONSULTANT according to the procedure shown on the CADD Files Acceptance Form (Figure A2-31). A copy of the completed form will be returned to the DESIGN CONSULTANT.

CADD TRANSMITTAL MEDIA

All CADD files and the Transmittal Form electronic file shall be submitted, unzipped, on a standard CD.

MEDIA LABELS

The DESIGN CONSULTANT shall furnish a permanently attached label on each CD showing the following:

1. Consultant, Site, Contract, Task
2. Date
3. Item within total count (for example, 2 of 5)

A2.12 PHOTOGRAMMETRY

The following abbreviated model scope of services statement identifies many technical issues and shall be used as a model in obtaining photogrammetry. However, the DESIGN CONSULTANT shall adapt it to fit the specific situation (see Chapter 6 of Volume I, CWP Guidelines).

1. Aerial survey sub-consultant shall supply on CD a single three-dimensional (3D) MicroStation design file format containing mapping data in a continuous form (single map). Graphics shall be positioned in the approximate center of the design plane and the global origin shall be adjusted to match the California State Plane Coordinate System. Elevations shall be based on City of San Diego datum.

   The design file shall be supplied with a working unit format (MU:SU:PU) of MU=1:SU=10:PU=1,000.

   Design file shall be furnished in compliance with the standard schema for separation of graphic data as described on Figure A2-2.

   Each contour shall be a continuous element.

   Only standard MicroStation text fonts shall be accepted for text in the design file. The font library used to create the design file shall be furnished.

2. Aerial survey sub-consultant shall supply cell library file containing all cells used in the design file.

3. Aerial survey sub-consultant shall use MicroStation default color table file.

4. Aerial survey sub-consultant shall supply an ASCII data file containing all XYZ data points related to ground surface and surface features collected from photographic models. It is preferred that this file contain feature codes relevant to the point data which identify ridges, breaks and obscure areas for later processing under the MicroStation software.

Coordinate values of X, Y, Z for regular points shall be provided in a separate ASCII file, to provide for later processing under the MicroStation DTM (Digital Terrain Modeling) software. The three coordinates for a point shall be together on a single line in the file. Each value shall be written as a whole number, a decimal, and two decimal places, and shall be right-justified within a 13-character space. There shall be no leading zeros. These points shall be the original points that generated the contours shown on the corresponding design file.

A2.13 DELIVERABLES

All CADD files and electronic files of all forms shall be delivered unzipped, on standard CD, at each project milestone level of completion, including 30%, 60%, 90%, 100%, as-bid and as-built drawings submittals. The following checklist is a summary of required items that the DESIGN CONSULTANT shall deliver to the Project Manager.

1. Mylar plots with original signatures and seals.
2. MicroStation design file corresponding exactly to each plot
3. MicroStation design files used as reference files
4. Plotting parameter files of all types
5. Font libraries
6. Cell libraries
7. Patterning libraries
8. Color tables
9. Aerial survey contour map files with corresponding X, Y, Z point coordinates in ASCII files

10. All parameter files associated with the use of MicroStation application software

11. Forms, completed as shown in the examples:
CADD Directory Structure (Figure A2-21)
Design File Log (Figures A2-25 and A2-26)
Design File Log included in design file
Cell Library Log (Figure A2-27)
Cell Design Log (Figure A2-28)
CADD File Transmittal (Figure A2-30)

12. All CADD files and electronic files of all forms to be delivered unzipped on standard CD

CELL LIBRARY LOG

CLEAN WATER PROGRAM
for Greater San Diego

File Name ______________________________

Description ______________________________

Directory ______________________________

Project Name / No. ______________________________

Project Engineer ______________ Log Originator ______________

Cell Name	Cell Description	Placement		
		Scale	Angle	Rel/Abs

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x3de

CELL LIBRARY LOG

FIGURE A2–27

CELL DESIGN LOG

CLEAN WATER PROGRAM
for Greater San Diego

Cell Name _____

Cell Library _____

Design Information

Type	Level	Color	Line Weight	Line Code	Patterning	Text Font	Nested Cells
Regular Point Menu							Yes No

Placement Information

Design File Working Units	Scale	Angle	Level Rel/Abs

Cell Graphics (Indicate Cell Origin)

Originated By:	Date:

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CELL DESIGN LOG
FIGURE A2–28

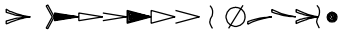
STANDARD TEXT STYLES

FONT 1 ABCDEFGHIJKLMNOPQRSTUVWXYZ 0123456789

FONT 26 ΑΒΧΔΕΘΓΗΙΚΛΜΝΟΠΞΡΣΤΥΦΩΧΨΖ

FONT 50 ABCDEFGHI JKLMNOPQRSTUVWXYZ Ø123456789

FONT 77 **ABCDEFGHIJKLMNOPQRSTUVWXYZ 0123456789**

FONT 102 

NOTES:

1. THE ALPHABET ABOVE IS THE ACTUAL MINIMUM SIZE (0.12 IN) AND WEIGHT (WT=1) THAT SHOULD APPEAR ON A D-SIZE SHEET.

2. PEN TABLE FULL.TBL SHOULD BE USED FOR FINAL PLOT SIZE. PEN TABLE HALF.TBL SHOULD BE USED FOR ANY REDUCED PLOT SIZE.

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11/22/2005

STANDARD TEXT STYLE
FIGURE A2-29

CADD FILE TRANSMITTAL

Consultant	Date	Document Control #
Site	Contract	Task
Media Type And Count		
Command For File Retrieval		
Directory Structure For File Retrieval		

In the space below, list each file with its full directory path, drawing number, transmittal status (preliminary, final, revised) and the size of the plot transmitted (if any).

Attach a computer printout to this form showing the file name, size in bytes or blocks and the date last modified for each file.

File Name	Drawing Number	Status	Plot Size
apfaclay.dgn			

Originated By:	Date:

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CADD FILE TRANSMITTAL FORM
FIGURE A2–30

CADD FILE ACCEPTANCE

CLEAN WATER PROGRAM
for Greater San Diego

Consultant	Date	Document Control #
Site	Contract	Task
Media Type And Count		

ACCEPTANCE CHECKLIST

- ☐ Verify media type, count, and proper media labels.
- ☐ Compare list of files on transmittal form to required computer printout. Make sure that plots are attached as indicated.
- ☐ Retrieve files from media.
- ☐ For each file, compare the name, size, and date last modified to the computer printout.
- ☐ Bring each file up on a graphics terminal to verify that view one contains the title block and view five contains an overview.
- ☐ Verify each file with the EDG utility.
- ☐ Plot each file.
- ☐ Compare each plot to transmitted sheets.

Note any problems or exceptions.

Verified By:	Date:

C:\MyDgnFiles\levelog\a2_31.dgn x3de
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CADD FILE ACCEPTANCE FORM
FIGURE A2-31